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To Reduce Costs, Study the Work

What Cycle Time Study Observations May Accomplish in Minimizing Unproductive Work, Improving Plant Facilities and Design and Stabilizing Wage Rates

BY GEORGE K. HOOPER*

At a time like the present, when the industrial air is full of talk about efficient management, time studies, cost accounting and the like, it seems to the writer that *The Iron Age* has done a distinct service to those manufacturers who want to make progress, by pointing out in a recent editorial† the necessity of applying time study to a whole cycle or sequence of operations instead of to separate parts of the cycle. The writer has had many years' experience in investigating plant operations, discovering sources of inefficiency and advising remedies. This experience has shown that the warning of *The Iron Age* as to the mischievousness of unscientific time study is very much needed.

Why time study that is worth while ought to cover cycles of operation instead of being devoted to study of the separate elements of the cycle of operations will be clear enough with a little careful consideration of the case. Any manufacturing establishment, fundamentally, is an institution for the employment of labor, with the purpose of making profit therefrom. This labor consists of that directly employed in production and commonly called productive labor and that auxiliary thereto, known as non-productive labor. The productive labor is therefore the economic foundation of the establishment, and this situation is reflected in the uniformly accepted methods of manufacturing accounting, which make the cost of so-called productive labor a basis on which to build the cost structure and with which to compare the rest of the expense of providing this so-called productive labor with the means of working.

Why Non-Productive Operations Need Study

This necessary expense is usually equal to or greater than the productive labor cost, as evidenced by the fact that so-called overhead charges vary in manufacturing establishments from a little less than to sometimes one-half more than the productive labor cost. The productive or tooling operations therefore form from 40 to 60 per cent. of the whole expense of manufacturing an article; hence, if time studies are made only of the actual tooling operations, but 40 to 60 per cent. of the cost problem is attacked and the results are necessarily inconclusive.

By studying cycles of operations, which is but another name for studying everything that the skilled laborer is obliged to do to perform any definite task, a very large part of the overhead expense is laid bare to analysis, leading not infrequently to as radical and as great economies as have been accomplished by the study of the so-called productive or tooling operations only, in addition to enabling placing overhead expense on a systematic basis for its better control. Any study which provides a means of controlling overhead expense is of great value, since this cost is a permanent and nearly constant one and must be met whether business is good or dull, and accurate means of minimizing it, especially for dull times, should be eagerly welcomed by the manufacturer.

Side Lights on Employee's Surroundings and Facilities

The efficiency of labor outside of the mere tooling operations is directly governed by the employee's surroundings and facilities, and in the writer's knowledge, no other or better way exists for controlling this part of his employment than the cycle study of the work. The general efficiency of the laborer is controlled by his surroundings and by the class and number of appliances furnished him for performing his work, in the shape of drawings, templates, schedules, gauges, handling appliances, etc., and the quality of supervision extended over him. Certain of these factors have been noticed by keen observers, and in a general way analyzed. Their importance is, however, shown up in its true value by the cycle method of timing.

In recording the time of any individual or gang of laborers by this method, stop watches are used and every operation performed is noted, regardless of what it is. The continuity of the timing is preserved by the use of a sufficient number of watches and observers to insure one watch being always in use, recording the time of any particular operation.

In practice, it is rarely necessary to use more than one observer and two watches, as from his experience, the writer has found it possible to note and record alone all of the operations performed by a gang of six men engaged in differing tasks on a single piece of work, such, for instance, as the fitting up of plate girders, truss members or columns either plate or latticed, in structural steel work. This was accomplished with two watches.

The whole time spent on the completion of any task is thus recorded in a form capable of analysis. Not only this, but it is possible to study the proportion of each operation, whether productive or not, both to the whole and to the other operations of the cycle. The different aspect thus given to the proportions of a task is very valuable. Significant ratios like those of the non-productive to the productive parts of a task when compared with the general non-productive to the productive labor ratio of the plant as a whole, where the product is a fairly uniform one, frequently compel immediate attention with resultant benefit.

Measuring the Preliminary Mental Processes

The general preparation, for instance, for any particular task is frequently a point where considerable time is mis-spent. The nature of the information furnished the workman in the way of drawings, forms, gauges, etc., may lead to considerable losses. It has been stated in the report of the "House Committee to Investigate Various Systems of Shop Management,"* that "there is no work that can be performed or that is performed that is not preceded by a mental process on the part of the workman. The more skill needed in the work, the greater the mental process which precedes the expression of it. So far as your committee has been able to learn, there is no method known to Scientific Management by which a time study

*Hoover-Falkenau Engineering Company, New York City.

†*The Iron Age*, November 9, 1911.

**The Iron Age*, March 21, 1912.

can be made of the mental processes preceding the physical act."

Had the Committee been made familiar with the cycle method of time study, it is safe to say that this deduction would never have been made, since it is perfectly possible by this method to record the time spent in this preliminary process and determine therefrom whether the proper information is afforded and in such form as to reduce this mental process to a minimum. This is an important point, as it affects also the whole conduct of the drafting room and tool department, and extends sometimes to the estimating and purchasing departments, as these use directly the information prepared in the drawing room.

The time consumed in this "preliminary mental process" can certainly be controlled. As to the process itself, its results are a matter of personal efficiency easily controlled by intelligent working supervision. The study of this preliminary so-called mental process is very important where the work of a large machine tool involving the use of a considerable amount of floor space, expensive handling appliances and a gang of men is involved.

Instances of Saving in Preliminary Work

The manufacturer always studies with great care the cost of housing, serving and driving a large machine, the aggregate expense of these factors being frequently large. The extent and nature of the instructions furnished to the workman who has charge of this apparatus will determine whether it shall be employed a longer or shorter time on any particular work. The writer has a case in mind in which by a slight change in the form of the information furnished to the machine operator, a considerable proportional saving was made in this operation as a consequence of the cycle study. Copies of material lists made and used by the estimating and purchasing departments of the plant in question were furnished for instruction to the machine operative. The raw material had to be cut up for a product in which the suitable cutting up represents a considerable percentage of the total work.

A slight change in arrangement which added little or nothing to the work of the clerical departments named, reduced the preparation period by about one-half, and this applied not only to the operative, but as well to his machine, the handling apparatus and a gang of men. It is believed that but for the cycle method of time study the true cost of this loss would have remained undiscovered.

Saving in Productive Work by Cycle Studies

Passing next to the tooling or so-called productive operations, the speed of the tooling will of course be noted. Several able engineers have studied and written up this subject exhaustively, so that it will not be enlarged upon here. It should be noted though that the time consumed in properly securing tools in the machine, adjusting them in proper position and in other ways setting the machine into operation, can be duly recorded by this method and any inconveniences or losses involved revealed in their true value, the necessary remedy usually being obvious to the observer as the recording of the operation proceeds.

An illustration of the importance of this phase came within the writer's experience a few years ago in observing the tooling operations upon a considerable variety of similar work in small pieces done by two machines of similar type and size, but of different make. In one there were frequent stoppages in the progress of the work for the adjustment of the tool block, apparently of insignificant duration. These stoppages when registered by the cycle method of study were found to total about 10 per cent. of the operating time of the machine on the job.

When the machines were run all day on that class of work, which was ordinarily the case, this loss became of great importance, especially as two helpers were required with each machine operative. The natural result was the reconstruction of that feature of the machine, but beyond that point lay the guidance offered in farther purchases of machine tools of that sort.

It will follow directly from the preceding remarks that all other features involving loss, such as arrangement of machine tools, with reference to one another, and the lighting and supplying of power to them, providing access in convenient manner and supplying the necessary sundries, such as tools, lubricants, etc., etc., will also be indicated.

Information Obtained on General Plant Design

The immediate deduction can, therefore, be made by means of this cycle method that if each machine can be properly located with reference to the others, and provided with its necessary equipment and conveniences for economical operation, the departments can also be arranged, thus leading directly to the conclusion that the form and magnitude of the buildings necessary for turning out a given product are also revealed. It requires but a short farther glance to indicate that the relative location of the respective buildings of a plant is also dictated from the results of this study. The whole plant is thus accurately planned from the study of characteristics of the work done within it.

As an example, an instance from the writer's experience is in his mind in connection with the design of a plant for fabricating structural steel into buildings and bridges. The cycle time study developed the fact, during observation of the method of handling and piling material between operations, that transverse piling is more advantageous than longitudinal piling; hence, any increase in volume of business requires more expansion in the width of plant than in length, as increases in length of the product are comparatively small and infrequent and increase in tonnage requires transverse space only. The shape and general construction of the building to house operations on this class of material is immediately dictated, as is, in fact, the shape of the plot of land to be used as a suitable site for the plant, and the general location of the buildings upon the site is indicated.

A Stable Basis for Rate Setting

In the setting of prices for contract or piece work, whether straight piece work so-called, or according to any of the differential or premium plans, the cycle time study obtains a far more satisfactory record than can be obtained in any other manner. There will be less uncertainty as to what a man can accomplish when a record of his work is gained in this manner and the rate setting can be determined with greater certainty of permanency.

The factors on which a very considerable part of the efficiency of a skilled laborer is based lie entirely outside the tooling operations, in the necessary movements which he makes in administering his task. The cycle method of time study offers probably better means of securing the necessary average result upon which a rating can be made than any other method, and as well offers a means of predicting how any change in method will affect any rate. There can be no question that a nearer approach to truth can be gained by this method than by any other.

No better example of the benefits of cycle time study can be found than in the foundry, where the large proportional expenditures for non-productive operations have been disclosed and analyzed with the result that what is known as the continuous system is now in use in many plants putting the production of castings on a manufacturing basis and increasing considerably the efficiency of the labor employed in foundry tasks.

After a considerable experience with this cycle method, the writer believes that increases of efficiency of labor of 25 per cent. are not unusual by making proper use of the information disclosed by it.

A New Metal Roofing

The Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., has placed on the market a new type of metal roofing which has been patented by its president, J. E. Annis. This roofing which is known as the Annis patent Saflok has the right edge of each sheet raised to form a V with a folded pocket close to the V on the inside. The left edge has a similarly raised V with a projecting hook-like flange which catches in the pocket, the one V overlapping the other. By this arrangement all the nails are completely covered, thus preventing rust and leaks at the nail heads, and wooden strips are done away with. It is claimed for this roofing that the greater the strain placed upon it due to wind pressure or any other cause, the tighter the lock becomes.

The Pittsburgh Testing Laboratory has opened an office at 204 White Building, Seattle, Wash., in charge of C. A. Perkins, district manager.

Mining Engineers' Adjourned Meeting

The June Bulletin of the American Institute of Mining Engineers contains the following notice concerning the important adjourned meeting, heretofore referred to, at which amendments to the constitution are to come up for discussion:

"At the annual business meeting of the Institute, February 20, 1912, it was voted to postpone the consideration of the proposed amendments to the constitution until June 3, 1912, and the meeting adjourned to reconvene on that date, or on such subsequent date as should be fixed by the special committee of five appointed on February 20 and the Board of Directors of the Institute, acting jointly. Due to various causes, including absence of two members of the committee in Europe for two months, it has not been possible for the special committee of five to complete its report in time for preliminary distribution to members of the Institute and consideration by them prior to June 3, 1912, and it has been mutually agreed by the special committee and the Board of Directors to postpone the date at which the adjourned meeting shall be reconvened from June 3, 1912, to October 7, 1912."

New 12-24-In. Gap Lathe

The Barnes Drill Company, Rockford, Ill., has recently brought out a new sliding extension bed gap lathe of improved design and larger than its former 13-22-in. model which was illustrated in *The Iron Age*, July 2, 1908. The new machine has a 14-24-in. swing. It is designed more liberally in regard to sizes throughout, particularly in increasing the cone pulley diameters to give added driving power, in strengthening the compound parts and in adding to the weight of the tailstock spindle. It is equipped with a geared feed box giving six quick change geared feeds, both longitudinal and cross, varying from 0.007 to 0.049 in. It will cut either right or left hand threads from 2 to 18, including 11½ pipe thread, by twos up to 36 threads and by fours up to 48 threads.

The top bed is fitted on the main bed with a dovetail construction and is held in place by clamp bolts. A cut steel rack and pinion with a long screw and crank at the

secured to the back of the carriage and travels with it. Any taper up to 2¼ in. per foot can be turned.

A countershaft is furnished with the lathe, but for small shop purposes or where it is desired to place the machine independently of the line shafting the lathe can be arranged easily for a self-contained motor drive for which a 2-hp. motor running at 1200 r.p.m. is recommended.

The following table gives the principal dimensions and specifications of the lathe:

Swing over bed, in.	14½
Swing over carriage, in.	10
Swing in gap, in.	24
Number of cone pulley steps	4
Diameter of largest cone pulley step, in.	10
Diameter of smallest cone pulley step, in.	4
Width of cone pulley steps, in.	2½
Diameter of hole through spindle, in.	1 9/16
Diameter of spindle nose, in.	2½
Diameter of front headstock bearing, in.	2 5/16
Length of front headstock bearing, in.	3 7/16
Diameter of rear headstock bearing, in.	2½
Length of rear headstock bearing, in.	2¾
Diameter of tailstock spindle, in.	1 13/16
Morse taper of tailstock spindle	No. 4
Morse taper of headstock spindle	No. 5
Ratio of back gearing	11 to 1
Diameter of feed screw, in.	1
Size of tools handled, in.	½ x 1½
Diameter of friction pulleys on countershaft, in.	10
Face width of friction pulleys on countershaft, in.	3
Speed of countershaft, r.p.m.	200
Angular travel of compound rest, in.	3
Distance between centers, closed, in.	36
Distance between centers, extended, in.	54
Length of gap, in.	18

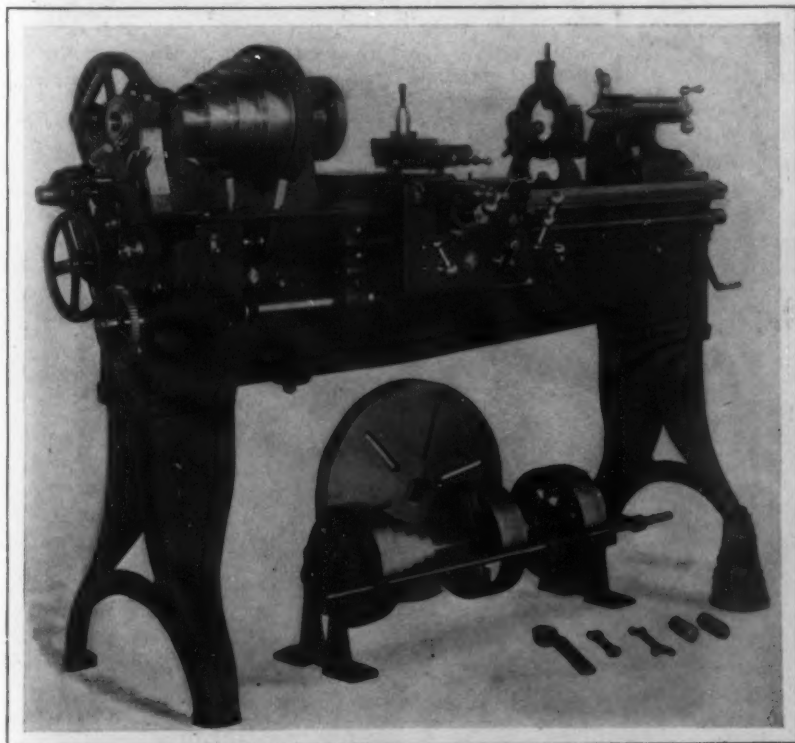
This lathe is regularly furnished with two lengths of bed, 5½ and 7½ ft. respectively. When the longer bed is furnished the distance between closed centers is 60 in. and the gap is 36 in. instead of 18 in., so that work having a maximum length of 96 in. can be accommodated.

The Dominion Steel Corporation's Earnings

A Montreal dispatch states that the annual report of the Dominion Steel Corporation and constituent companies shows that the steel subsidiary's earnings were smaller than expected and the coal company's better. The general result for the 12 months ended March 31 was to leave the parent company, after all fixed charges had been met, provision for sinking fund and generous allowance for depreciation, etc., a small margin—about ½ per cent.—over the amount required to pay the 4 per cent. dividend on the common stock. Comparisons are rendered somewhat difficult by the fact that a profit and loss statement of the corporation is now being submitted for the first time, and covers a period of one year and nine months from July 1, 1910, to March 31, 1912.

The net earnings of the corporation for the full period of its existence were \$3,690,149, or \$1,484,940 more than required for dividend payments. The surplus March 31 was \$784,954. Assets and liabilities show a total of \$76,566,341, of which \$10,391,044 is current and working assets, and \$65,885,428 is properties. The liabilities include \$23,595,577 funded and mortgage debt, \$6,043,551 current liabilities, \$485,466 reserve, \$7,000,000 preference stock, \$30,656,800 common stock issued and \$8,000,000 preferred stock of the constituent coal and steel companies.

The coal company for the 12 months showed net profits available for dividend on the common stock at the rate of 8.5 per cent. The surplus for the year over preferred and common stock dividends was \$670,417.



A New 12-24-In. Gap Lathe Built by the Barnes Drill Company, Rockford, Ill.

rear of the lathe serve to draw back the top bed and extend the gap. The new lathe has a larger spindle with a diameter of 2-15/16 in. and a bore of 1-9/16 in. to take 1½-in. stock. The tailstock is the offset type with a set over adjustment for taper work. The taper attachment is

The Concrete-Cement Age Publishing Company announces the union of Concrete, Cement Age and Concrete Engineering under the name of Concrete-Cement Age, with principal offices at 97-99 Fort street, West, Detroit Mich.

Making the Ford Motor Car

How Records Are Kept of Materials in Process of Manufacture and of Workmen's Time and Production—The Power Plant Unique*

BY O. J. ABELL

The power plant of the Ford Motor Company is a producer gas installation. It is not only specially noteworthy from this fact and in the size of power units, but also in the extent to which arrangements have been made for conserving heat. A general ground plan of the power plant layout is shown in Fig. 25 and a cross-sectional elevation in Fig. 24. The producers are of the mechanically operated type manufactured by the Wellman-Seaver-Morgan Company, Cleveland, and in Fig. 26 a view of the two first installed is shown. The complete producer plan will include eight producers.

These producers are to be designed with superimposed water heaters for taking up the waste heat from the gas-making operation. These will be auxiliary to the general hot-water heating plant consisting of 10 Erie City Iron Works boilers of which six are 72 x 18 ft. and four 78 x 18 ft. There is no steam space in these boilers, the

runs by gravity through a chute into the Jones underfeed stokers with which the boilers are equipped. A rubbish burner into which waste paper and packing material continually accumulating around the plant is charged without other fuel has been installed and takes care of two boilers.

The gas engine now installed, a view of which is shown in Fig. 27, develops 1500 hp., while a new unit now nearing completion will be installed calculated to develop 5000 hp., being the largest gas engine unit in this country operating on producer or other gas. Both were designed by Edward Gray, consulting engineer of the Ford Motor Company, and are generally similar except that for the new engine a new type of valve motion has been devised which will be entirely underhung below the engine frame. The entire mechanism will thus be in the subfloor space under the engine room. The smaller engine is a simple tandem with 35 x 48-in. cylinders, while the large engine will be twin tandem double acting with 42 x 72-in. cylinders.

The engine is designed very liberally in the weight of its parts and particular attention has been given to the water cooling jackets and passages. The exhaust gases pass downward from the engine cylinders through four columns vertically ribbed with hollow water circulating sections and are then conducted through an auxiliary water heater before reaching the air. The engine circulation water which is thus intended to take up all the heat possible is considerably preheated before passing through the heating boilers and out into the shop heating system. The boiler stokers are automatically controlled so that the boiler may be regulated as the requirements vary.

To take up the heat in the excess water a low-pressure steam turbine is installed direct connected to a generator. From the engine circulation water heat and the gas-producer heat this turbine is easily supplied and the power obtained practically without cost. The returning water is

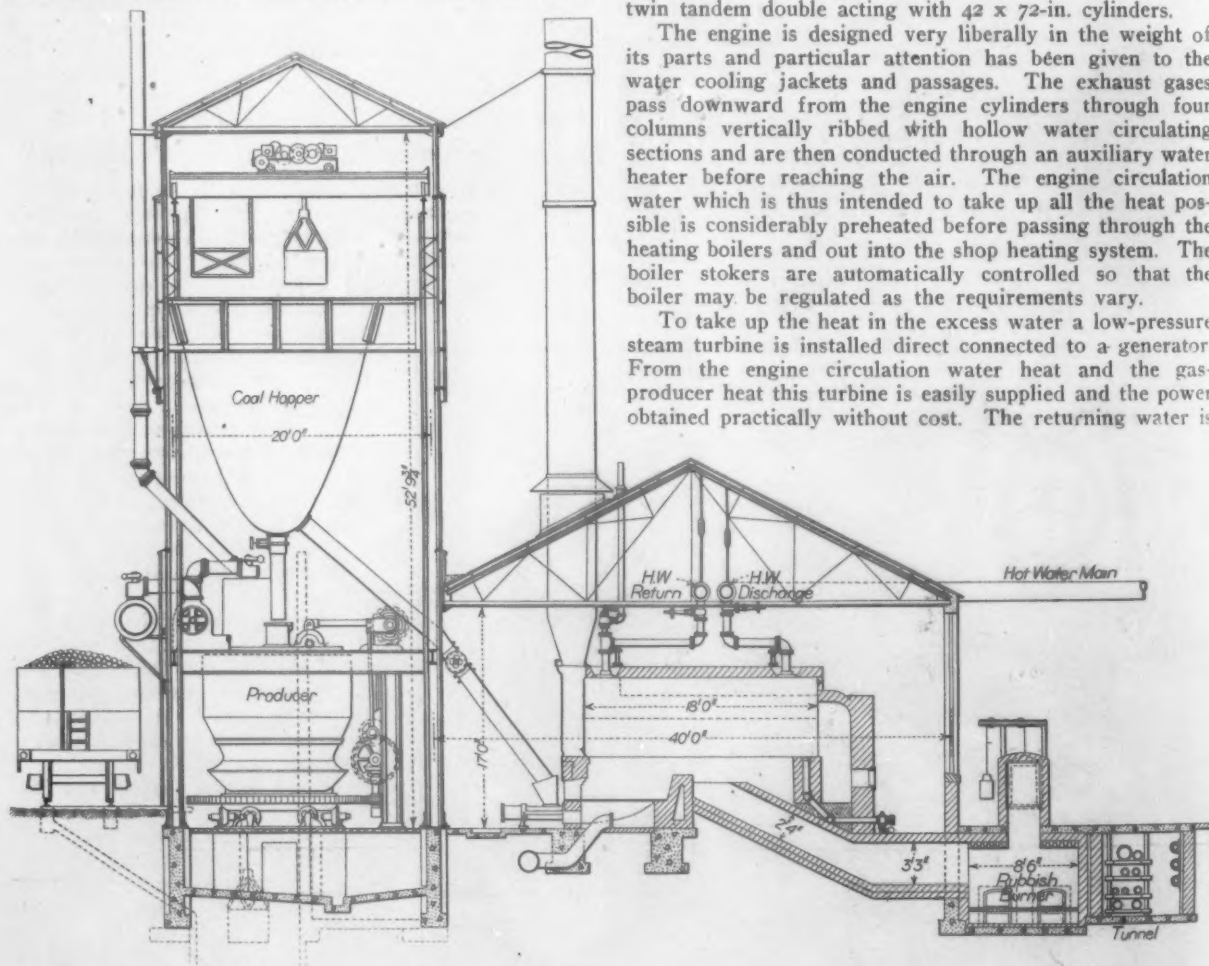


Fig. 24—Sectional Elevation Through the Coal Handling and Boiler Plants, Showing the Gas Producers and the Hot-Water Heating Boilers Which May Utilize Coal, Gas from the Engines or Even Heat from a Rubbish Burner

shells being filled with tubes with the exception of a unit for supplying steam for hammering machines and small auxiliary pumps. The coal-handling arrangement includes a 1000-ton concrete coal storage pit from which the coal is elevated by crane and grab bucket, as indicated in the illustrations, to overhead bunkers having a capacity of 100 tons for every 16 ft. in length. This bunker is directly above the producers, while coal for the boilers

used for conditioning the air through the air-conditioning apparatus which serves the heating plant in winter and the ventilation of the shops in summer. For water storage a 300,000-gal. tank has been built and inside of the steel supporting columns of this tank a 35,000-cu. ft. gasometer is arranged to move up and down on the central water pipe as a vertical axis.

Movement of Materials Through Works

It has not been possible to preserve the general scheme for the movement of material through the plant without

*Second and concluding part of article in the issue of June 6; the first part covered chiefly the operations of the foundry, heat treatment and machine departments.

some minor departures, and in consequence, auxiliary receiving stations, stock rooms, incidental manufacturing and painting operations, assembly and testing floors, may be found in convenient places though somewhat at variance with the general plan.

Incoming material to be placed in stock will be received through a general receiving room located at the north end of John R street which crosses the plant through the middle of the general plan shown in Fig. 4 in last week's issue. It is placed in stock on the upper floors of the four-story building. In general this material is in a finished state of manufacture and ready for the final car assembly, so that it can be handled directly down the elevators to the car assembly floor when requisitioned.

Raw materials requiring machining move from the craneway across the machine shop floors on either side to the east and west through successive finishing operations of turning, grinding, drilling and milling, and toward the south end of the machine shops as the individual parts are gradually assembled. This combined movement accumulates the machined parts at the north end of the machine shop floors, around the motor, transmission and axle assemblies. These assembled parts then move through the testing floors at the south end to the car assembly floor in the east building. The department in which the finished car is given a running test is also at the south end so that the car can be moved in a continuous direc-

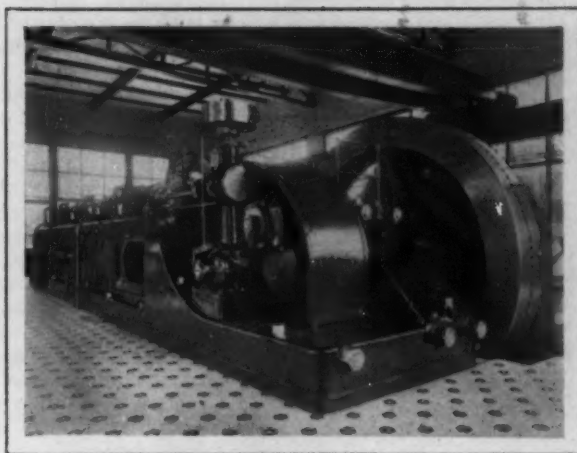


Fig. 27—The 1500-hp. Gas Engine to be Supplemented by one of 5000 hp.

tion from the assembly floor to the shipping platforms. To each lot of incoming material unloaded on the receiving platform for delivery to the receiving department is attached a yellow so-called partial delivery ticket. When the complete shipment has been received it is ac-

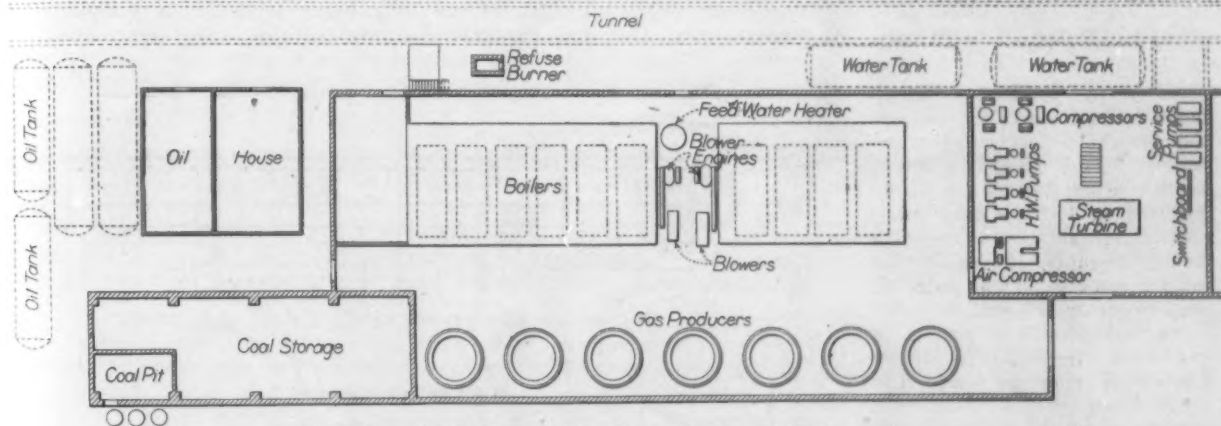


Fig. 25—General Plan of the Gas Power Plant

tion from the assembly floor to the shipping platforms.

To each lot of incoming material unloaded on the receiving platform for delivery to the receiving department is attached a yellow so-called partial delivery ticket. When the complete shipment has been received it is ac-

trated in Fig. 29. In the receiving room, an inspection force checks every item for quantity and quality. For example, a scleroscope test is made of every gear installed, to determine its hardness. The inspection record is placed on the receiving tags. As indicated in the views presented in the last issue,

each bay of the main buildings is numbered consecutively from north to south and each floor is lettered so that, for example, the designation C-20 locates a particular bay on the third floor on the west four-story building.

Following inspection the material is routed by a routing clerk to that part of the plant where the particular material is kept in stock or wherever else it may be required, the designation being marked on the original tags which continue to accompany the material. Both the yellow and white tickets have detachable stubs which are returned by the clerk at the stock delivery point to the receiving department as a receipt. It is therefore possible to route a partial delivery into the shop without waiting for complete unloading. When



Fig. 26—View of the Gas Producers, Showing the Bottom of the Coal Bunkers and the Boilers in the Background at the Right

acknowledgment to the owner; the third, an order record; fourth, a shipping record; fifth, a finishing department copy, and sixth, a sales department record.

To keep this system in proper working order, to straighten out tangles of all description in the handling of material, to trace lost items which range from the smallest part to finished cars, and to ferret out opportunities for improving conditions, a force of clerks is detailed for this specific and general purpose. They have no regular routine and are available for whatever contingency may arise at any time. They operate in the department of the shop superintendent.

Specialized Labor on a Time Basis

Labor in all departments of the plant is paid on a time basis only. Recently the 10-hr. day basis on which the plant has been operated was changed to 9 hr. with a per hour increase in wages to all the employees such

that the average daily wage was increased about 5 per cent. It would not be unnatural to expect a piece rate or premium system of wages in connection with a scheme

of operations so highly specialized, but the remarkable output obtained per man per machine under the present system, considering the character of labor employed, leaves little to be said regarding the fiat time rates in force.

It is maintained in this connection that the installation of certain machines, each with a rated capacity for turning out product, establishes definitely a possible rate of production to which one may attain, but beyond which the equipment is not intended to operate efficiently. By making an allowance of perhaps 10 per cent. for time when the operator is not at the machine, it is possible to arrive at an accurate expectation concerning the most practicable rate of production. It is considered preferable, therefore, to accept this rate and to bring the human element in step with the rated machine capacity during 90 per cent. of the time and to pay a straight wage for that labor rather than to accept the variable output per man under piece rate or premium inducements.

Three phases of the scheme of shop management enter into the proposition of keeping the human factor up to the established machine rates. Most important in this regard is the fact that orders have always been far ahead of production. No element is more conducive to a continued high rate of production than the pressure of accumulated or rush orders. No influence is more creative of enthusiasm. At no time in its history have the successive plants of the Ford Motor Company, despite their wonderfully rapid increases in capacity, been able to produce

ACKNOWLEDGMENT OF ORDER FROM
Ford Motor Company
DETROIT

READ THIS OVER CAREFULLY AND REPORT BY CHECK ANY ERRORS IN CORRESPONDENCE ALWAYS REFER TO THIS NUMBER

ORDER NO. 32636

CUST. DATE	ORDER DATE
NO.	SHIP TO
DATE REC'D	CHARGE TO
TERMS	
REMITTANCE	VIA WHEN

SPECIFICATIONS		PRICE	AMOUNT
MODEL			
BODY COLOR	SIZE		
TIRES			
LAMPS			
HORN			
TOP			
SPECIAL EQUIPMENT			

DETACH THIS AND SEND TO CUSTOMER

Fig. 35—Sales Order Form Blank, $8\frac{1}{4} \times 9\frac{1}{4}$ In. White and Blue Sent to the Customer, for Verification; No. 3, Thin White Paper, is Filed Numerically on Order Record Binder, and Contains Space for Noting Date of Shipment; No. 4, Light Yellow, is for the Shipping Clerk and Like No. 3, Shows the Automobile Number and Also Date, Car and Route of Shipment; No. 5, Thin White, is Sent to the Finishing Department; No. 6, Deep Pink, is for the Sales Department and Has the Shipping Information.

FOREMAN'S COPY

PRODUCTION ORDER

SYM. NO. _____

ORDER NO. **501**

Date _____

Dept. _____

PLEASE MAKE THE FOLLOWING:

No. of Pieces	NAME	Sym. No.

INSTRUCTIONS Deliver to _____ Dept.

Blue Print References

APPROVED Signed _____

MATERIAL REQUIREMENTS

Lbs.	Pcs.

Deliver Only Material Authorized Hereon.
If More or Less Required Notify Production Office for Instructions.
Give Notice At Once of any Delay.
No Work to be commenced Without an Order.
Mention Order Number on Requisitions, Time Cards, Etc.
When Completed, Date, Sign and Return to _____ Dept.
Date Completed _____
Pieces Actually Comp. _____

Record, Spoilage, Material, Rec. and Del. on Reverse Side

Fig. 24—Production Order Blank, $8\frac{1}{2} \times 11$ In. White, Foreman's Copy; Light Blue, Superintendent's Copy; Pink, Stock Room Issuing the Stock; Yellow, Stock Room Receiving the Stock; Salmon, Production Office Copy; Dark Yellow, Stock Office Copy; Light Green, Cost Department Copy. The Stock Room Copies and Those of the Foreman and the Production Office are Ruled on the Back to Note the Different Requisitions Covering Stock Received and Issued

REPORT OF PERSONS EMPLOYED			
TO THE MANAGER:		DATE _____ '19	
I HAVE EMPLOYED _____			
NAME _____		NO. _____	
IN THE _____		DEPT. AS A _____	
COMMENCING _____		M. _____ '19	
ADDRESS _____		RATE \$ _____	
LAST EMPLOYMENT _____			
PREVIOUSLY EMPLOYED HERE _____		'19 NO. _____	
REMARKS _____		AGE _____	
SIGNED _____		O. R. _____	
_____		Superintendent	

Form 10.

APPROVED BY _____

Fig. 39

Fig. 38—Outside of the employee's reference record manila envelope, 4 x 6 in.

Fig. 39—One of the forms kept in the employe's envelope. The other blanks inserted in the envelope, as occasion demands, is a report of dismissal, checking whether the employe is good, medium or poor and giving the reason for discharge; another blank covers a transfer indicating the reason; another covers an advance, giving both the old and new rates; another is for recording a change of address, and

the sixth is a card to be signed by the gatekeeper and foreman, giving the holder the right to enter or leave the works and having figures to be punched for the time when the card is presented.

Fig. 40—Pay check and some of the time ticket forms, about two-thirds actual size, and all manila

DAILY TIME CARD					DATE.		
ORDER NO	ARTICLES		HOURS	EXPENDED TIME	OPERATOR NO.		
	NAME	OPERATION	MACH		STARTED	FINISHED	
			ONE	1635			
					STARTED		
			OPER	LIT		FINISHED	
TOTAL							
SIGNED				OPERATOR			
DEPT.				FOREMAN			

Fig. 41

EMPLOYEE'S NAME				EMPLOYEE'S NO.					
DEPARTMENT				OCCUPATION					
PAY ENDING 191	HOURS WORKED	HOURLY RATE	RATE BEGINS 191	AMOUNT EARNED	PAY ENDING 191	HOURS WORKED	HOURLY RATE	RATE BEGINS 191	AMOUNT EARNED
JAN 19					JULY 19				
31					31				
FEB. 19					AUG. 19				
" 29					" 31				
MAR 19					SEPT. 19				
" 31					" 30				
APR 19					OCT. 19				
" 30					" 31				
MAY 19					NOV. 19				
31					" 30				
JUNE 19					DEC. 19				
30					" 31				

BEGAN..... 191..... OLD NOS..... ADDRESS.....

TRANS..... 191..... NEW NO..... LEFT..... 191..... REASON.....

Fig. 38

cards. There are similar tickets to that for the foundry, for example, covering such work as motor assembling, miscellaneous minor assembling, magneto assembling, gasoline tank assembly, heat treating department, radiator assembly, painting, testing and blacksmith work, axle assembly, frame assembly, assembling chassis, finishing and shipping, branch factories and core room

Fig. 41 — Workman's daily time card, $5\frac{1}{2} \times 6$, manila card. A similar card in salmon is used for overtime.

[illegible]

FIG. 40

FORMS OF TIME AND OTHER RECORDS OF EMPLOYEES

S. DIESCHER & SONS.
Mechanical and Civil Engineers.
PITTSBURGH, PA.

large fund in one day; it results in a better distribution of work in the time-keeping department and it has been found that a much smaller proportion of the men fail to appear on the day after pay-day than when the entire force receives its wages at one time. From the standpoint of the community and the men, this method has been found to operate greatly to their benefit both as to the prevention of pay-night dissipations and the flooding of the community with checks running into many thousands of dollars to be handled by the grocer and the saloon keepers. All wages are paid in currency except when a man is discharged, at which time he is paid by check.

In conclusion it must be said that in its details the Ford plant presents a striking succession of devices from which economies of time and material are effected, and of which the foregoing description is little more than a general suggestion.

A Universal and Tool Grinding Machine

Recently the Brown & Sharpe Mfg. Company, Providence, R. I., has added a universal and tool grinding machine to its line. This new machine is especially adapted to the grinding of milling, formed, beveled and angular cutters; straddle, face and end mills; straight or taper reamers and similar work. Straight or taper cylindrical grinding can be done and by adding attachments internal and surface grinding can also be handled. The capacity of the machine is work having a maximum length of 18 in. and a diameter of 13 in. An unusual and valuable feature for a machine of this kind is the provision for wet grinding. The tank is cast around the base, increasing the weight. The waste water is well taken care of and guards prevent the spray from wetting the floor.

The machine is of substantial design, being exceptionally rigid and free from vibration. The base and column are cast in one piece, affording a firm support for the wheel spindle and the knee which carries the saddle and table is braced internally by stout transverse sections. The spindle has a transverse adjustment of $1\frac{1}{2}$ in., a vertical adjustment of 4 in. and a radial adjustment to any desired position. The main movements are obtained in the knee, which slides on ample ways on the column, in the saddle mounted on the knee and in the sliding table which rests

The sliding table is operated by a crank located on the front of the saddle and has a longitudinal adjustment of 26 in., a transverse adjustment of 8 in. and a vertical adjustment of $10\frac{1}{2}$ in. It will swivel 45 deg. on either side of the center, the setting being facilitated by a graduated surface. Adjustable stops are provided. The transverse and vertical adjustments are obtained by handwheels located on the front and the side of the machine which are graduated to read in thousandths of an inch. Protection against dirt and grit is afforded by metal guards.

A variable speed mechanism consisting of multiple friction disks located at the side of the machine furnishes 16 changes of work speeds ranging from 110 to 530 r.p.m. To change the speed it is simply necessary to move the lever to a position opposite the required speed, the variations being shown by figures cast in the cover of the machine. The lever at the front provides a means for starting and stopping the mechanism independent of its drive. The speeds are transmitted to the headstock by a flexible shaft and in this way it is pointed out a high efficiency is obtained and a wide range of speeds is possible.

The protection of the working parts has also been given careful attention. The ways are all covered and all oil holes and parts needing frequent adjustment are carefully protected.

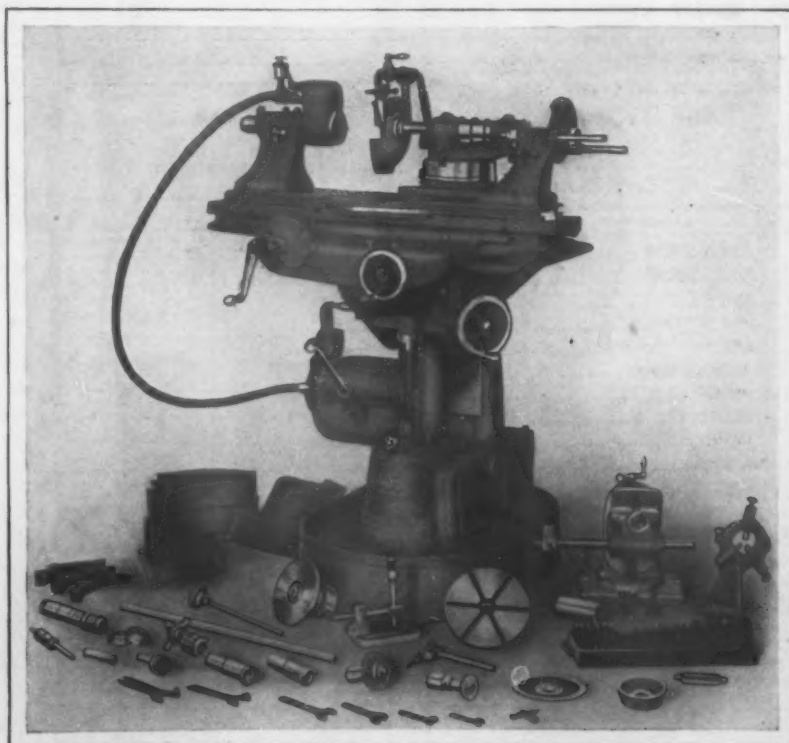
The Steel Industry and the High Cost of Living

A measure of the steel industry's offending as a contributor to the high cost of living is presented in the following editorial in the American Metal Market. Inferentially it indicates that the present campaign against big business is influenced more by the size of the institution attacked than by its direct impression upon the pocketbook of the consumer:

"From some aspects, it is certainly a gruesome spectacle that the chief trust busting activities of the country should be exerted in an industry which is not contributing to the high cost of living, but is instead making a contribution in the other direction. Witness the fact that Bradstreet's index number of commodity prices stands at the highest level on record, and it is at least 20 years old, whereas steel products are selling at only a trifle above the historic low level and are very much below the various high levels of the past 13 years.

"Either the country does not expect any material relief from the high cost of living through holding down the steel industry, or it fails entirely in a quantitative conception of the influences which make up the high cost of living. The quantitative conception, however, is readily made. For example, last quarter the great steel trust made about \$7 per ton on its steel output, before paying bond interest and allowing for depreciations, extinguishments, sinking funds, etc. The total steel output of the country in finished form is running less than 25,000,000 tons a year, which makes \$175,000,000, or less than \$2 per capita. In other words, the country is paying less than \$2 per capita to give the steel industry a chance to allow for depreciation, etc., and make a return upon its capital investment.

"Throughout the country there are trusts, conspiracies, arrangements, or whatever they may be called, by which prices of butter, ice, eggs and many other necessities are controlled. Some of the contributions levied are very high. How long would it take to pay \$2 per capita to these organizations? Certainly the first month of the new year would not be far advanced until \$2 per capita had been paid in. That is the quantitative conception."



A New Universal and Tool Grinding Machine Built by the Brown & Sharpe Mfg. Company, Providence, R. I.

upon the saddle. The machine is driven by a 1-in. belt, running over a two-step cone pulley, the speeds being 3180 and 3970 r.p.m.

The Chattanooga Iron & Coal Company, C. E. Buck receiver, is relining its blast furnace at Chattanooga, Tenn., and expects to blow it in about August 1.

A New Flue Cleaning Device

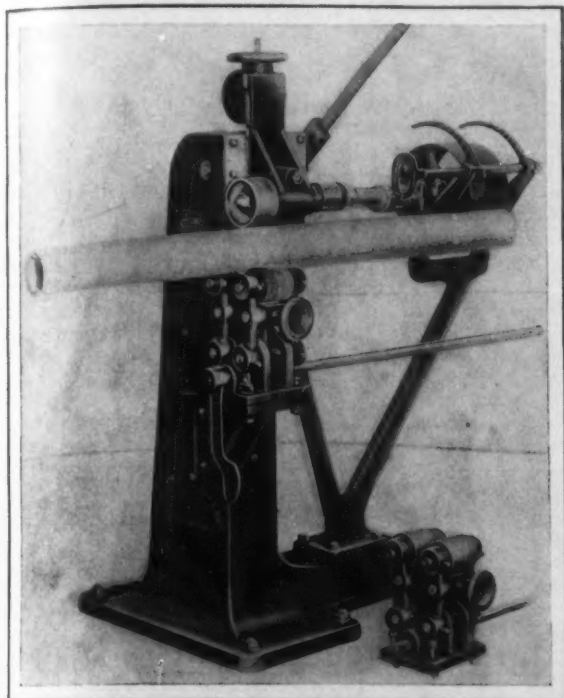
A new device for cleaning flues which is intended to be used as an attachment for a flue cutting machine, particularly one of the Mathews type, is being offered by Joseph T. Ryerson & Son, Chicago, Ill. On the flue cutting

past, as stated on page 1405 of *The Iron Age* of June 6, tests have been conducted at Coatesville to determine the comparative efficiency of the Jacobs-Shupert firebox over the old style firebox. These tests were also made under the supervision of Professor Goss and were most exhaustive. Three of the new type fireboxes were put in service on the Lehigh Valley Railroad last week.

A Heavy Cold Stock Riveting Machine

The Hemming Bros. Company, Inc., New Haven, Conn., has brought out a riveting machine in which the company's standard construction has been developed for heavy work. It is adapted to rivet from $\frac{1}{2}$ to $\frac{3}{4}$ -in. cold stock. The principle of operation lies in an eccentric shaft which carries a cup and cone friction actuated by a foot treadle. The eccentric shaft is connected with the spring and the hammer-carrying chamber by a link having an offset arm. This is hung in a recess in the lower end of the chamber, an arrangement which imparts the up and down movement and gives reciprocating action to the hammer rod, which is rotated by a worm and gear.

The riveter strikes 654 blows per minute, its depth of throat is 16 in.; over-all height, 85 in.; working height, 40 in.;



An Improved Type of Flue Cleaning Device Intended for Use with a Flue Cutting Machine Manufactured by Joseph T. Ryerson & Son, Chicago, Ill.

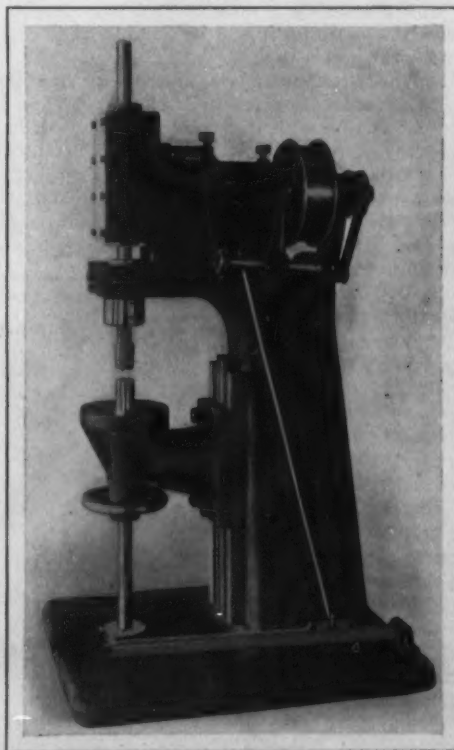
machine a friction wheel is substituted on the main spindle for the cutting disk and for the guide rollers on which the tube rests, two toothed burrs built up of hardened steel, toothed disks. The mounting in which the guide rollers are carried is bolted to a bracket so that this mounting may be removed very easily and a similar one carrying the cleaning burrs substituted. The substitution of the friction roller for the cutting disk is equally simple.

The friction roller is not mounted on the spindle squarely and the slight angle causes the tube to feed, the speed of travel depending upon the angle of the roller, although a rate of about 10 ft. per minute permits the complete cleaning of the flue without return. The machine with cleaning attachment accommodates the same range of tube sizes as the cutter is designed to handle.

A Firebox Destruction Test

A firebox test by which the measure of resistance to explosion of the new Jacobs-Shupert firebox, as compared with the old style radial staybolt firebox, will be held at the plant of the Lukens Iron & Steel Company in Coatesville, Pa., on the afternoon of June 20. Two fireboxes, one of each type, will be used in the test, which will be made by allowing the water in the boilers to get very low and the crown sheet highly heated and then suddenly filling the boilers with cold water. This process will be continued until both the fireboxes are ruptured in an effort to show that the Jacobs-Shupert firebox has a greater resistance to explosion than the old style firebox and that a rupture of a former cannot be classed as an explosion and is therefore not nearly so dangerous as the old style. The test will be made under the supervision of Prof. W. F. M. Goss, dean of the college of engineering of the University of Illinois.

Invitations have been issued by the Jacobs-Shupert U. S. Firebox Company to railroad men, locomotive builders and boiler makers all over the United States. The annual conventions of the Railroad Master Mechanics and Master Car Builders are held in Atlantic City just previous to the time set for this test and it is expected that a large number of those in attendance at these conventions will witness the test at Coatesville. For more than three months



A Machine for Riveting $\frac{3}{4}$ -In. Stock Cold Built by the Hemming Brothers Company, Inc., New Haven, Conn.

the weight, 2500 lb., and the floor space required, 38 x 48 in. The table is raised and lowered by a handwheel and screw of large dimensions.

May Copper Production and Stocks

The Copper Producers' Association has issued the following monthly statement for May, 1912:

Stocks of marketable copper of all kinds on hand at all points in the United States May 1.....	Lbs. 65,066,029
Production of marketable copper in the United States from all domestic and foreign sources in May.....	126,737,836
Deliveries of marketable copper in May:	
For domestic consumption.....	72,702,277
For export.....	69,485,945
Total.....	142,188,222
Stock of marketable copper of all kinds on hand at all points in the United States, June 1.....	49,615,643

The above figures show that the shrinkage in the stock of copper in May was 15,450,386 lb. The stock in producers' hands is therefore much below an average month's deliveries for either domestic consumption or export.

Norfolk & Western Coal-Handling Plant

The new coal-handling plant to be erected at Hampton Roads, Norfolk, Va., by the Norfolk & Western Railroad, the contract for which has been placed with the Wellman-Seaver-Morgan Company, Cleveland, Ohio, as stated in *The Iron Age* of May 23, will be an interesting installation not only because of its size but for the reason that it will have some new features marking a further step in the development of handling equipment. Railroads that reach some of the tidewater ports have recently shown considerable activity in planning for enlarging their coal shipping facilities. This is attributed to the increase in the volume of coal shipments from Eastern fields that is expected as a result of the opening of a new market with the completion of the Panama Canal. The Norfolk & Western Railroad already has quite an extensive coal-handling installation at Norfolk, to which the new plant, which is to be ready for operation in 1913, will be an addition.

The new plant, which will be erected at a cost of about \$1,500,000, will have a yearly capacity of 8,000,000 or 9,000,000 tons. It is stated that it will be the largest of its kind in the United States. Coal will be discharged from it to vessels on either side of a 1200-ft. pier, and capacity will be provided for loading four steamers at the same time. When the plant is in operation it is expected that a tramp steamer with a capacity of 6000 or 7000 tons can be loaded in five or six hours, and it will be capable of loading four or five such cargoes a day.

The handling equipment will consist of two complete duplicate plants, one for unloading on each side of the dock. In connection with this increase in its coal-handling facilities, the railroad company is having gondola cars built which will be of 90 tons capacity each, or larger than any now in use. These cars will be run under a double car dumper, which will dump them on each side into transfer cars, of which there will be two sets of six cars each. As the large gondola cars loaded will weigh 257,000 lb. each, powerful dumpers will be required to pick up the cars and discharge their contents into the transfer cars. The transfer cars will be electrically operated with a trolley system. When loaded these cars will be run a short distance to electric elevators, on which they will be hoisted 81 ft. As each transfer will weigh 120,000 lb. empty and 300,000 lb. loaded, having a capacity of 90 tons, elevators of very large capacity will be required.

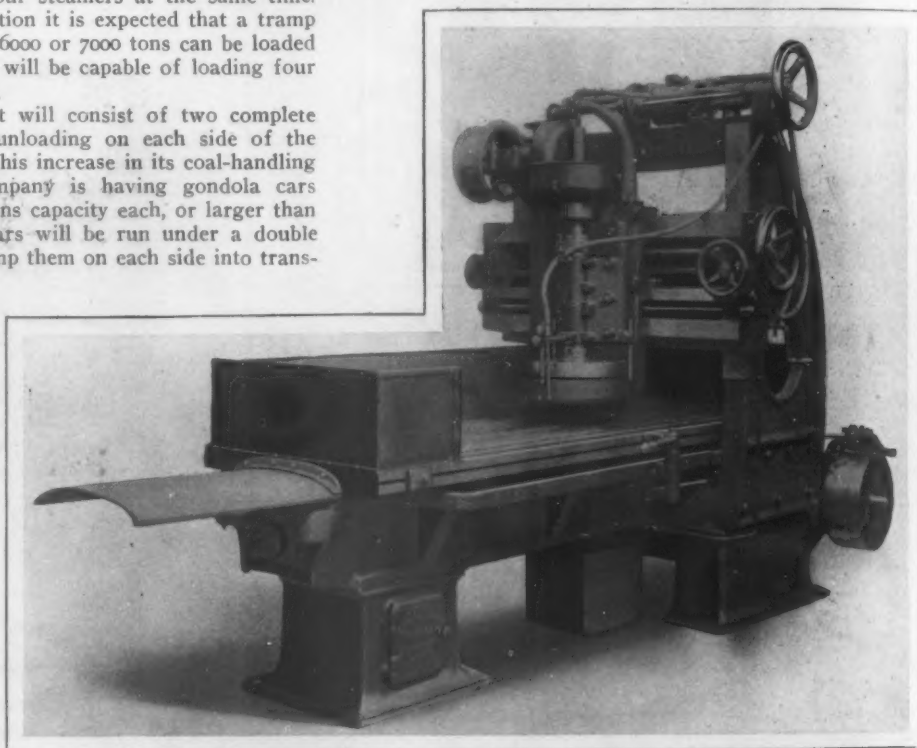
From the elevators the transfer cars will run under their own power on a level track over the pier and will discharge their loads into pockets in bins on either side of the pier. From the bins the coal will be discharged into the vessels. After discharging their load the transfer cars will turn and run down a switch-back gravity track built at a 7 per cent. grade to the rear of the unloaders, where they will be ready to take another load. When the plant is running, each one of the six cars in the set will be in operation. While one is being loaded the other five in the set will be completing the circuit of the plant up the elevator, discharging their cargoes and returning down the switch-back track.

The Sons of Vulcan, a labor organization composed of puddlers in the Pittsburgh and Central West districts, has made public its boiling scale for the year beginning July 1. It demands a straight rate of \$6 per ton for the year regardless of the selling price of bar iron. The scale will be presented to the manufacturers in conference some time this month, but is not likely to be adopted without opposition, as the Amalgamated wage scale for boiling is based on a sliding scale, declining and advancing with the price of bar iron.

Vertical Grinding Planing Machine

A modification of the Springfield-Brandes vertical grinding planing machine, which was illustrated in *The Iron Age* November 24, 1910, has been brought out by the Springfield Mfg. Company, Bridgeport, Conn. This new machine is a large planer type of surface grinding machine with a vertical spindle and ring wheel, similar to its predecessor, but the whole head is mounted on a cross rail on which it slides, thus giving the machine a large range. The particular field for which it is intended is in a shop where a great variety of work has to be ground by one machine.

The wheel head on this machine is mounted on a very heavy and substantial cross rail which has a cross movement of 36 in. and is traversed back and forth by a screw and crank handle as shown at the right end of the rail. A quick hand motion is imparted to the wheel head through the large handwheel shown and a slower or feeding motion is controlled by the smaller handwheel which engages with a worm and worm gear that can be very easily disengaged. The wheel head travels on a narrow guide having bearings of ample proportions. The general design of the wheel head is the same as the earlier machine, the



A New Vertical Planer Type of Grinding Machine with Movable Head Built by the Springfield Mfg. Company, Bridgeport, Conn.

wheel being 16 in. in diameter and driven by an accurately planed pair of bevel gears, one of which is cast iron and the other rawhide.

All the high speed bearings are either of the self-oiling or the sight-feed type. Liberal ball bearings are provided whenever end thrust occurs. The raising and lowering of the cross rail is accomplished by the regular straight and crossed belts and the same drive is also used for traversing the table through a worm and worm gear and a large coarse pitch screw operating in a nut 15 in. long. The equipment of the machine includes a pump and all the necessary attachments and as is shown in the accompanying engraving there is also a liberal water guard which surrounds the table to confine the spray. This is made in two sections and the front one, which is shown removed, is so made that it can be readily taken out and put back by sliding it in from the top and locking it in position with thumb nuts.

This machine has a capacity for grinding work 30 in. wide, 22 in. high and 7 ft. long. The weight of the machine is 13,450 lb.

Jerusalem is to have an electric street railway, electric lights and a modern fire engine.

Rateau-Smoot Mixed Flow Turbine

Exhaust of Reversing Engines, South Works, Illinois Steel Company, Assisted by High-Pressure Steam for Continuous Operation

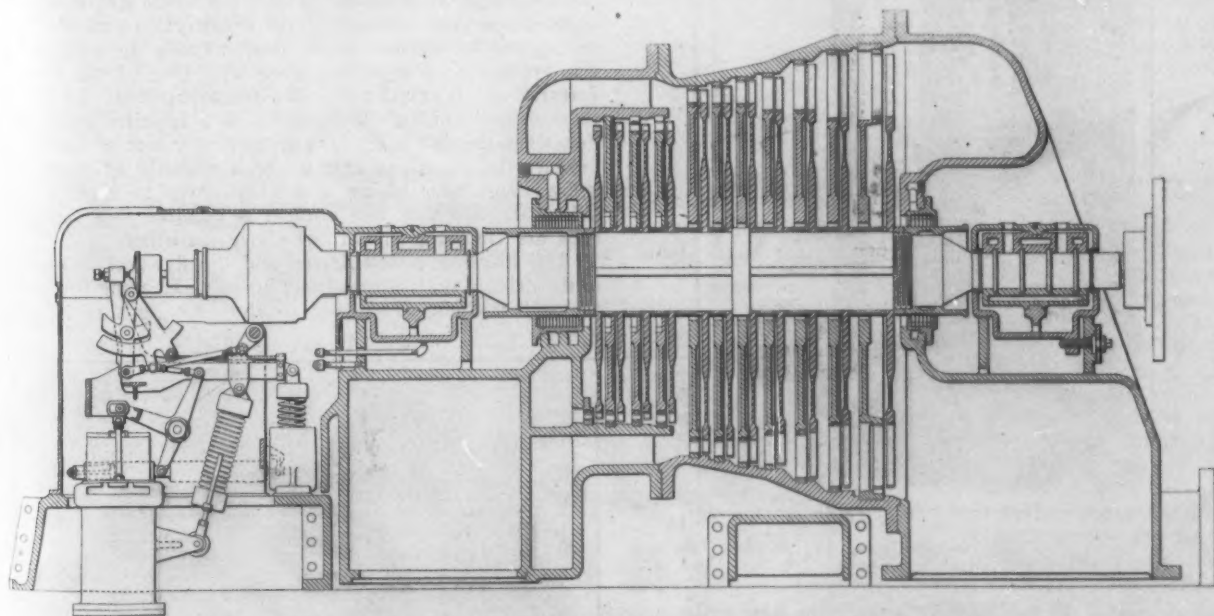
The Illinois Steel Company has put in operation recently a low-pressure turbine installation at the South works, South Chicago. It utilizes the exhaust steam of several reversing engines. The exhaust steam is directed into five steam regenerators furnished by the Rateau Steam Regenerator Company, New York. This equipment is designed so that the intermittent flux of exhaust steam may be transformed into a steady flow, taking care of full load on the steam turbines not only during the mill cycle but also when the mill cycle is interrupted for periods not exceeding 2 min.

The steam turbines are mixed flow machines of the Rateau-Smoot type. They were designed by C. H. Smoot of the Rateau-Smoot Company and manufactured by the Southwark Foundry & Machine Company. The accompanying illustration is a cross-section of the turbine, which has an entirely independent high-pressure section. High-pressure steam passes through the high-pressure wheels and after being expanded enters the low-pressure section.

vided with springs to hold the carbons in contact with the shaft.

The governor is direct acting. The fly balls and spring against which they actuate are mounted within a steel shell, which is fixed directly on the high-pressure end of the turbine shaft. The motion of the fly balls is transmitted by means of links directly to the high and low-pressure throttle valves. The governor is powerful to enable it to have a very active control over the displacement of throttle valves, and has been found to give a high degree of regulation at the Illinois Steel plant. When first put into service the turbine regulation was adjusted for 3 per cent., changing from no load to full load. When placed in parallel with other machines it was observed that the turbine took all of the load when it increased and dropped most of its load when the load decreased, owing to the fact that the other machines with which it was in parallel were not so closely regulated, and it was found necessary to readjust the governor so as to give a 6 per cent. difference between no load and full load speed in order that the unit might carry at all times its proper share of the load on the entire system.

The governing mechanism is arranged so that the action of the fly balls is to hold open the valves, and in consequence the breakage or disconnection of any of the links between fly balls and valves works to close the



Section Through Rateau-Smoot Turbine Using Both High-Pressure and Low-Pressure Steam

In other words, the turbine when working on live steam is a complete high-pressure machine. Around the high-pressure section of the turbine the low-pressure steam is admitted direct to the low-pressure wheels. By means of this arrangement the highest possible economy obtainable, it is emphasized, is attained when working on either high or low-pressure steam.

The governor is designed so that the pressure of the low-pressure steam may control the selection of the source of steam and so that no live steam is admitted to the turbine before the low-pressure steam has become deficient; in other words, when the pressure in the low-pressure source has reached atmospheric pressure in this instance. This occurs when the steam regenerators have been delivering steam during a shutdown of the mill engines for a period of more than 2 min. and during this period the turbine has been carrying full load. The turbine is rated at 3000 kw. when using low-pressure steam exclusively and 4000 kw. continuous load when using high-pressure steam. A second turbine is under construction for the works.

The bearings have ring-oiled lubrication with water cooling in the bushings, and this is said to be the largest turbine in the world having this form of lubrication and of bearing cooling, which is independent of the continuity of operation of oil pumps or other auxiliary devices. The stuffing boxes are built up of a number of consecutive rings of carbon blocks separated by diaphragms and pro-

vided by their own weight, the high pressure valve, in addition, being assisted by a closing spring.

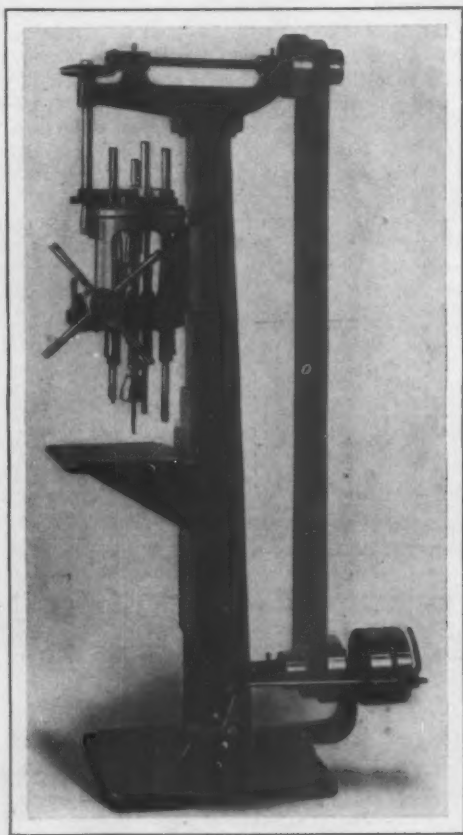
The mixed flow feature of the governor includes a piston actuated by the low-pressure steam, which rises and falls with the pressure in the low-pressure steam main. When the low-pressure steam has a high pressure (in this case some 20 lb.), the piston allows the fly-ball governor to actuate the low-pressure valve for its full travel while holding the high-pressure valve in a closed position at all times. As the quantity of low-pressure steam decreases, the piston which it actuates descends, giving a greatly increased opening to the high-pressure valve until it reaches its lower limit, under which conditions the low-pressure valve is in a closed position and the high-pressure valve is actuated by the fly balls for its maximum displacement. An intermittent position of the control piston gives a simultaneous opening to both high and low-pressure valves.

Forty firms, it is stated, are building turbines in England, 20 building marine turbines exclusively. Of the marine turbines built all but two are reaction turbines, but of the land turbines about 14 are impulse machines of various designs. At least two firms are specializing in small turbines. On the Continent there also appear to be 40 firms known to build turbines. About eight are reaction turbines and the remainder impulse.

Vertical Boring and Chucking Machine

For manufacturing that class of work where more than one operation is to be performed on the piece at any one setting such as drilling stepped holes, reaming, counter-boring, end milling, facing, tapping, etc., the Turner Machine Company, Danbury, Conn., has brought out a four-spindle drilling machine, which it designates as its turret vertical boring and chucking machine.

As will be noticed from the accompanying engraving, the column of the machine is a rectangular box section casting. At the top of the column is bolted a bracket



A New Turret Type of Vertical Boring and Chucking Machine Built by the Turner Machine Company, Danbury, Conn.

which carries the regular countershaft, the cone pulley and a bevel pinion meshing with a bevel gear that drives a vertical shaft. This shaft drives the various spindles of the machine through spur gears mounted on its lower end and meshing with others on the individual spindles and the lower end of it is journaled in a bracket mounted on the upper part of the column. The gears mounted on the spindles can be of such sizes as to drive their respective spindles at any desired speed within a very wide range. The turret is fitted inside the cylinder bracket casing at the upper part of the column and has an indexing mechanism so that any one of the spindles can be instantly brought into the operating position and locked there with its driving gear in engagement with the driving gear on the vertical shaft.

The indexing pin which is located at the front and lower part of the bracket casing carrying the turret is thrown out of engagement with the turret by a small ball ended lever. When this has been done the turret can then be rotated in either direction by the double ended lever shown at the left of the machine. When the next spindle has been brought into the operating position the indexing pin is automatically released and locks the turret, although if desired, the lever controlling the operation of the pin can be held down until the desired spindle is brought into the operating position or the turret can be revolved in one direction without the automatic lock operating.

The spindles are reamed to fit a No. 4 Morse taper and will drive drills ranging from $\frac{1}{4}$ to $\frac{3}{4}$ in. in cast iron. They have a traverse of 7 in. and each of them runs in a bearing in the upper part of the turret and at the bottom in a quill having a feed rack which engages with a feed

pinion on the end of the feed shaft when the spindle is in the operating position. Individual coil spring counter-balances are furnished for the spindles and will lift them to the highest point of their traverse or will hold them at any desired point when they are not in the operating position. The distance from the column to the center of the operating spindle is 8 in. and the maximum distance between the operating spindle and the platen is 28 in.

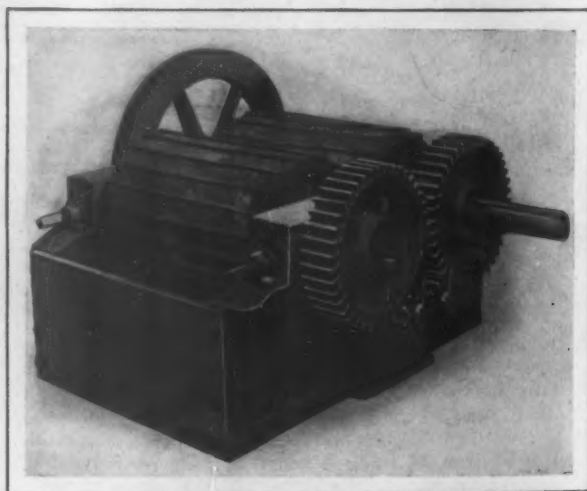
The machine is built in several other styles and sizes to suit various classes of work and all the gears have guards as is shown in the accompanying engraving. The over-all height of the four-spindle machine is 74 in. and the floor space measures 24 x 25 in. The weight is 700 lb.

Rock Crushing Machine

For crushing coal, stone, cinders, etc., E. Cooper Wills, 69 Yeomans avenue, Washington, N. J., has designed a new type of crushing machine. Among the special features of the crusher are the employment of sectional rolls, the production of a grinding as well as a crushing effect and a special arrangement of roller journals and guides so that both gears will be in mesh when the rolls are shifted to give a variation in the size of the finished product.

The machine is of heavy cast-iron construction with the exception of the rolls, which are made of sectional high carbon steel castings. This construction enables the castings to be shifted on the shaft to take up wear and also renders them readily replaceable. One of the novel features of the machine is the arrangement of the roll journals and guides, which are set at a sufficient angle so that when the roll is set for any particular size of finished product the gears are kept in mesh with the idler gears below them, thus giving a positive drive to both rolls. When an extremely fine product is required two sets of rolls are employed placed one above the other.

The machine is belt driven and the flywheel is keyed to the driving shaft, which has a keyway extending through the roll sections. The ratio of the gears is 5 to 4, the



An Improved Type of Machine for Crushing Rock Designed by E. Cooper Wills, Washington, N. J.

drive roll having the higher speed. In this way a grinding effect is secured in addition to the regular crushing one.

Several sizes of machines are built, the medium size producing 40 tons of coal per hour with an expenditure of 30 hp. This machine weighs 3000 lb. and occupies a floor space of 4 x 6 ft.

Fraser & Gray is the name of a new firm at 30 Church street, New York, composed of John Fraser and Thomas Gray, which has taken over the engineering business conducted by John Fraser at 50 Church street. The firm will do a general contracting business in the installation or overhauling of machinery of all kinds, particularly of power and manufacturing plants. Its work is largely with consulting engineers who appreciate having their plans carried out by men of large experience in engineering matters, and with efficiency engineers in their proposed rearrangements of existing plants.

Experiments on Durability of Tool Steel*

Cutting Tests at Different Cutting Speeds and with Different Cooling Mediums Compared with Toughness and Hardness Indications

BY EDWARD G. HERBERT

The durability of a tool is measured by the length of tube it will turn away before attaining a measured degree of bluntness. Tests made at a succession of cutting speeds from 20 ft. per minute upward were reported in a former paper by the author and showed a very low durability at the lower cutting speeds; an increase of durability as the cutting speed increased; a maximum durability at cutting speeds of 50 to 80 ft. per min.; and a decline of durability to a very low value as the speed was further increased. The theory was put forward that the observed changes in the durability of cutting tools are mainly caused by changes in the temperature of the cutting edge, due to varying quantities of heat generated at different cutting speeds. The heat theory was confirmed by experiments showing that changes of durability corresponding to those which occur under varying cutting speeds can be produced by varying the temperature of the tool in other ways while the cutting speed remains constant, viz., by varying the temperature of the water with which the tool is flooded; by varying the depth of cut (a heavy cut generating more heat than a light one), or by dispensing with the cooling water.

Low Durability at Low Speeds and Fine Cuts

It has been found by experiments on the tool steel testing machine that all tool steels, without exception, have a very low durability and are very quickly blunted when cutting under water at low speeds and fine cuts under conditions which preclude any considerable heating of the cutting edge; and it has been found that any alteration in the cutting conditions which tends to increase the temperature of the cutting edge, results in an increased durability of the tool.

All varieties of tool steel have been found to be capable, when suitably hardened, of producing double-peaked speed-durability curves, the characteristics of such steels being that at a certain speed they are less durable than at higher and lower speeds.

The principal action to which a tool is subjected in cutting is one of friction under heavy pressure. This tends to rub the surface of the steel away, by causing the particles of steel to slide over one another. To resist blunting by this action a tool must possess hardness. But the stress on the tool point is not constant; as the chip is detached it breaks up into a series of short segments (more or less completely separated), and this process subjects the tool to a succession of changes of pressure, amounting almost to blows, and tending to chip off portions of the cutting edge. To withstand this action the tool must possess toughness.

In order to measure, throughout a range of temperatures, those physical properties of a steel which constitute its durability, it is necessary to test it at each temperature for hardness and for toughness. The method finally adopted was that of breaking the specimen, supported at the ends on knife edges, by a load applied transversely at the center. The apparatus employed is illustrated in Fig. 1. The specimen A was in all cases 3 in. long, $\frac{1}{4}$ in. deep and $\frac{1}{2}$ in. wide. It was supported on knife edges BB, $2\frac{1}{2}$ in. apart. A third knife edge C was affixed to a plate F, and guided by pins DD sliding freely in holes in F. The whole was placed in a bath containing water, oil or salt,

according to the temperature under investigation, the specimen being completely immersed in the liquid. The bath was rested on iron blocks GG, with gas burners or blow pipes between them, and the whole was placed under the cross-head of a 100,000-lb. autographic testing machine.

Some of the resulting diagrams are reproduced in Fig. 2. The height of each curve represents the maximum load applied to the specimen to break or bend it, and this maximum load is taken as a measure of toughness. Curve *a* is from a specimen broken cold; being brittle, a small load sufficed to break it. Curve *b* is from a similar specimen broken at 238 deg. C. (460 deg. F.). It was tougher, and broke at a higher load. Curve *c* is from a specimen tested at 278 deg. C. In this case the specimen was very tough. It supported a heavy load, and bent without breaking. Specimen *a* was very hard; it gave only a small deflection for each increment of load, and the resulting diagram is nearly vertical. Specimen *b* was softer, and *c* very soft, and the slope of the diagram was greater as the hardness diminished. Numerically the hardness may be expressed as the load required to produce $1/10$ -in. deflection, and the hardness number is obtained by dividing the maximum load in pounds by the deflection in tenths of an inch.

Experiment with Crucible Steel Tools

Experiments were first made on a crucible steel containing about 1.3 per cent. carbon. A bar $\frac{1}{2} \times \frac{1}{4}$ in. in section was cut into pieces 3 in. long, which were heated to 800 deg. C and quenched in water. Some of the specimens were left in the dead-hard state, others were tempered by being placed for 15 mm. in an oil bath at 136 deg. C. Others were tempered in like manner at 145 deg. and 175 deg. respectively.

The results of the breaking tests are plotted out in diagrams A, B, C, D, Fig. 3. The full lines in these diagrams represent maximum loads at which the specimens were broken or bent (toughness), and the dotted lines represent the hardness, or maximum load divided by deflection. We have here, according to our theory, two of the elements for determining the variations of durability with temperature; but it is very difficult to say, from inspection of the curves, which temperatures might be expected to give the highest durability to the steel. The durability will be high when both the hardness and toughness are high. The durability will be low when either the toughness or hardness, or both, are low.

It is evident that if we multiply the hardness number by the corresponding toughness number for each temperature, we shall obtain a new series of numbers fulfilling the conditions just stated—they will be high when the hardness and toughness are both high; they will be low when either hardness or toughness, or both, are low. These numbers should therefore be in some degree proportional to the durability of the steel. We cannot say that they will be strictly proportional to durability unless we assume that hardness and toughness are the only qualities constituting durability, and that they are equally important factors in durability, but these are assumptions we have no right to make. Either hardness or toughness may be the more important factor, according to the nature of the material the tool is required to cut.

It is an established fact that the steel which is best for cutting hard materials such as tire steel is not necessarily

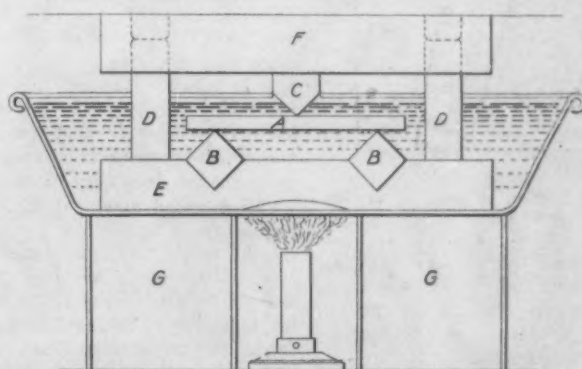


Fig. 1—Scheme for Breaking Steel at Different Temperatures

*From a paper read before the Iron and Steel Institute.

the best for cutting soft materials such as mild steel or brass, and this may be because a harder tool is required for one class of material and a tougher for the other. Nor can we safely assume that hardness and toughness are the only factors in durability. Some steels (notably the tungsten steels) possess a property of resisting abrasion which does not appear to depend directly on hardness or toughness, and can only be measured by an abrasive test—preferably an actual cutting test. It is certain that a tool which is very soft or very brittle will not be durable. It is almost certain that a given tool will gain in durability as it becomes harder and tougher; but it by no means follows that the specimen of steel which carries the heaviest load with the least deflection will make the most durable cutting tool.

Recognizing, then, that the product of hardness and toughness may bear only an approximately proportional relation to durability, let us examine the curves produced by plotting these products on a temperature basis. The curves are shown in Fig. 4, and the durability-speed curves obtained from specimens of the same steel by actual cutting tests made on the tool steel testing machine are shown in Fig. 5. Two sets of curves are shown in this figure. The full lines represent the durability of tools cutting under water, and the dotted curves are taken from the same tools cutting dry. It is at once apparent that there is a very striking similarity between the curves obtained by

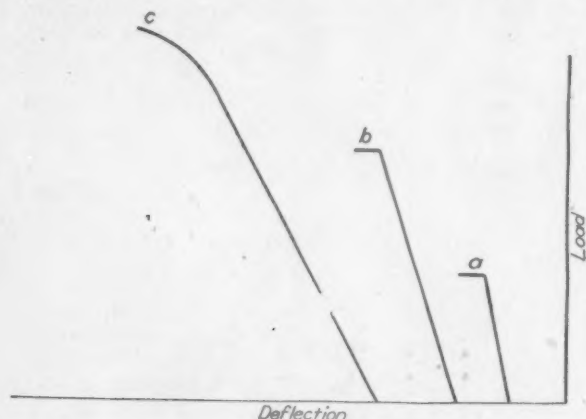


Fig. 2—Autographic Record of Steel Broken. a, cold; b, at 460 Deg. F.; c, at 530 Deg. F.

breaking (Fig. 4) and those obtained by cutting (Fig. 5). In each case there is a very low durability at low speeds or temperatures, a rise to a high maximum as the speed or temperature increases, and a fall to a low value when the speed or temperature exceeds a certain value.

It is especially noticeable that the range of speeds and temperatures which gives the steel a high durability is a very narrow one. One important difference will be noticed. The breaking tests all show a high durability at atmospheric temperature and a rapid fall to 50 or 100 deg., but this feature is entirely absent from the curves obtained by cutting. From this it might be surmised that at the lowest cutting speed, viz., 20 ft. per min., the edge of the tool was at 50 to 100 deg., and that the tools would have a higher durability when cutting at still lower speeds.

Tests were made at speeds as low as 2 ft. per min., and the tool was flooded with a freezing mixture, but the wear was extremely rapid, and no increase of durability was found. There is no doubt a considerable amount of heat generated in cutting a tough steel, no matter how slow the speed, and it may be that the cutting edge was considerably above atmospheric temperature even under the extreme conditions mentioned. This point, however, requires further investigation.

Test of High Speed Tools

Breaking tests were made with high-speed steels of two well-known brands. The specimens, $3 \times \frac{1}{2} \times \frac{1}{4}$ in., were hardened by being preheated for $2\frac{1}{2}$ min. at 850 deg., then heated for 50 sec. at 1275 deg., and quenched in salt bath at 672 deg. for 30 sec. The breaking tests were carried out in the manner described above, and the resulting hardness and toughness curves are shown in Fig. 6. The durability-temperature curves (Fig. 7) resemble those of the carbon steels (Fig. 4) in showing a marked fall in

durability from atmospheric temperature to 50 deg., this feature being entirely absent in the curves obtained by cutting (Fig. 8).

This effect of temperature on durability is shown in Fig. 9, which represents the speed-durability curves of a high-speed steel tool cutting (1) dry, (2) with lard oil, (3) with water. At the low speeds, 20 and 30 ft. per min., the tool was most durable when cutting dry, and least durable with water. At the highest speeds the position is reversed, while at intermediate speeds the lard oil gave the highest durability. The oil appears to exercise a double function. It acts as a cooling medium and enables the tool to work at much higher speeds than are practicable when cutting dry; but, as a cooling medium, it is inferior to water, and therefore less conducive to durability at very high speeds. It has, however, a lubricating effect which is not possessed by water, and is highly conducive to durability at speeds which do not generate an excessive amount of heat. The oil gives the highest durability, but not at the highest speed.

The curves in Fig. 10 illustrate the extreme importance of the time factor in the hardening of high-speed steel. The dotted curve represents the durability of a high-speed tool which was preheated for 4 min. at 850 deg., heated for 1 min. at 1275 deg. and quenched in salt at 675 deg. C. The full curve shows the durability of the same steel preheated for $2\frac{1}{2}$ min. and heated for 50 sec. at the same temperatures. Evidently the first steel had been injured by too prolonged heating.

The cutting tests have shown in every case that the durability increases when the cutting speed is raised above 20 ft. per min. These cutting tests have also shown that the durability always increases when a tool working at 20 ft. per min. is allowed to cut dry instead of with water, or with hot water instead of cold. It is impossible to doubt that these are different manifestations of the same physical change in the steel. A great deal of the metal cutting in every engineer's shop consists in taking fine finishing cuts, often with water on the tool. If such cuts are taken at a slow speed the temperature of the cutting edge may not rise above 100 deg., in which case the tool will be quickly blunted. Its durability can be increased by increasing the speed or by cutting dry. Many cases are known to have occurred in ordinary workshop practice, where an increase in cutting speed has actually resulted in increased durability of the tool.

High-speed steel can be so hardened as to retain its durability at fairly low temperatures, and there are now on the market tungsten steels specially adapted for low-temperature work, such as finishing very heavy forgings; but every description of steel known to the writer loses its durability if the cutting temperature is low enough. It should be noted that a low cutting temperature can only occur when there is a combination of low speed with light cut. A heavy or moderate cut raises the temperature of the cutting edge above 100 deg., even at very slow speeds.

The phenomenon of the double-peaked curve is not completely elucidated, though the evidence goes some way to explain it. The variations of hardness and toughness with temperature are of a complicated character, and the cleft between the two peaks of a durability curve appears to be caused by the conjunction of depressions in the hardness and toughness curves at a particular temperature. The relative heights of the two peaks are found to vary with the conditions of cutting, and this variation may be due to a change in the relative importance of the hardness and toughness factors, according to the quality of the material cut or the shape of the tool.

The decline in durability which takes place when a certain limiting speed is exceeded is evidently caused by an actual softening of the cutting edge by the heat generated in cutting. This softening, which is extremely local, takes place even when the tool and the work are practically immersed in running water. The speeds and temperatures at which the softening occurs depend largely on the particular hardening process which has been applied to the tool, and are generally highest in high-speed steel.

It is not yet possible to establish an exact scale of cutting temperatures corresponding to the scale of cutting speeds, but a comparison of the temperature-durability curves obtained by breaking tests with the speed-durability curves obtained by cutting tests, enables us to make an approximation, as in Fig. 11.

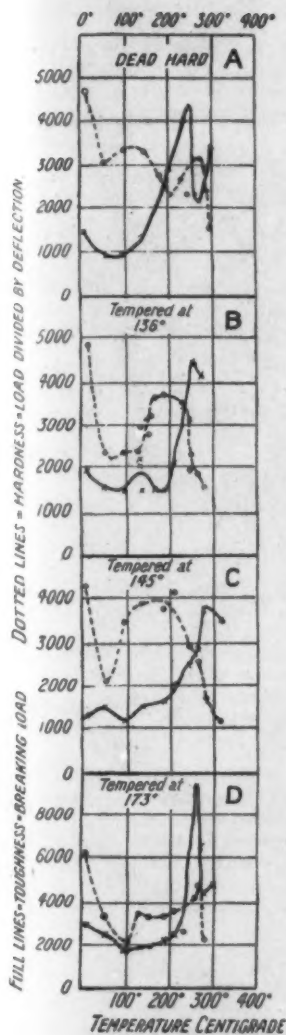


Fig. 3

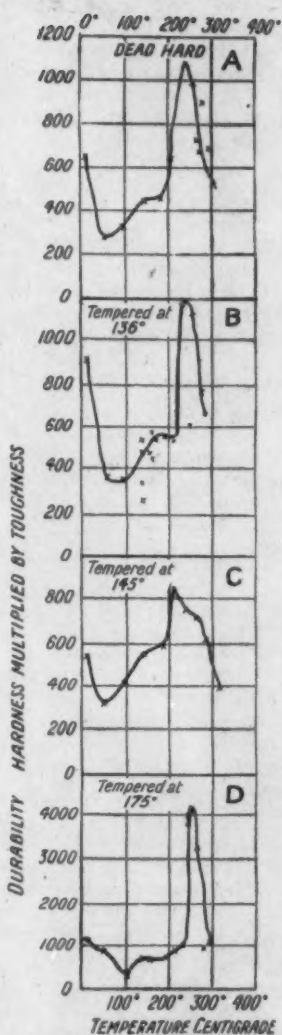


Fig. 4

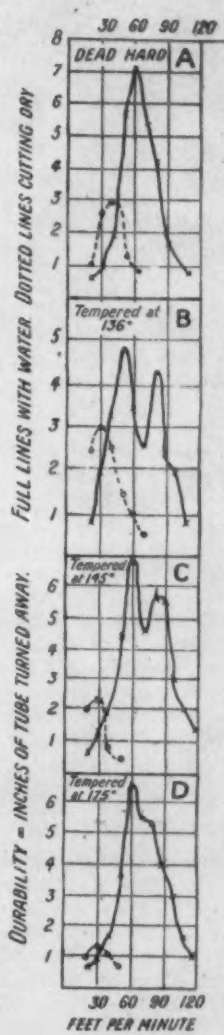


Fig. 5

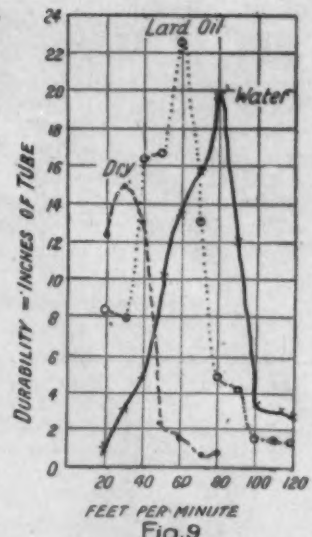


Fig. 9

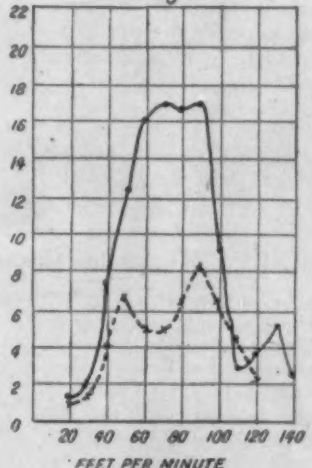


Fig. 10

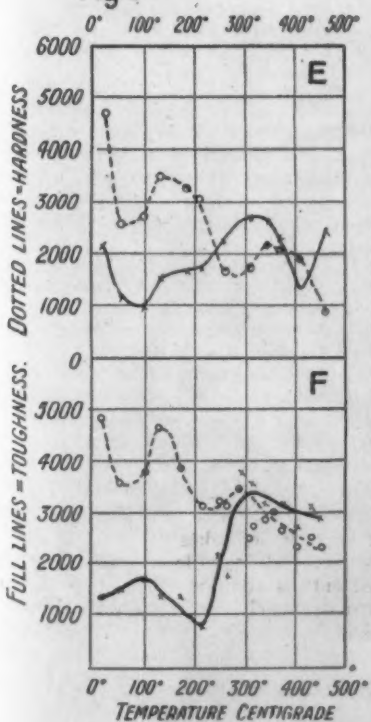


Fig. 6

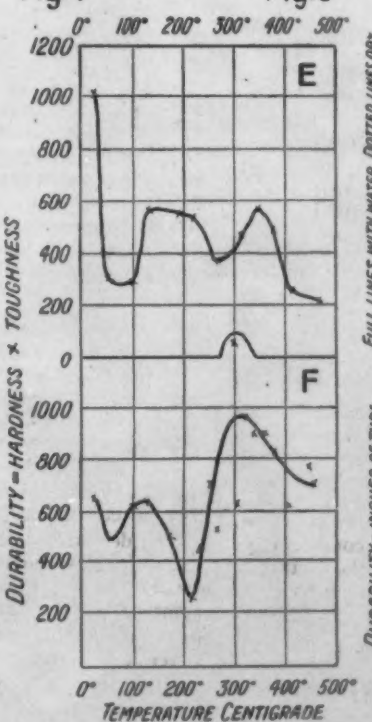


Fig. 7

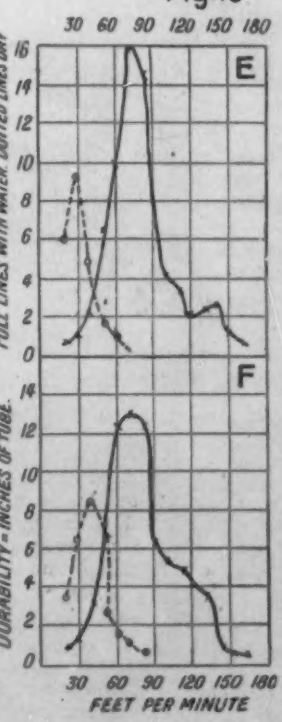


Fig. 8

CUTTING TESTS OF TOOL STEEL COMPARED WITH HARDNESS-TOUGHNESS DETERMINATIONS

Figs. 3, 4 and 5 cover tests with carbon steel; Figs. 6, 7 and 8 cover tests with high-speed steel; Fig. 9 shows speed-durability curves of a high-speed steel cutting with and without lubricants; Fig. 10 shows speed-durability curves of the same high-speed steel differently hardened

To establish a correspondence between the speeds of cutting with and without water, a comparison may be made between the full and dotted curves in Figs. 5 and 8, from which it appears that the effect of using water is approximately to double the cutting speed; in other words, the edge of a tool flooded with water attains about the same temperature as the edge of a tool cutting dry at half the speed. This must not be taken as a general statement applicable to all cutting operations. The dry cutting temperature depends largely on the volume of metal operated upon. The tube used in the tool steel testing machine is small in diameter and light in section; it becomes consider-

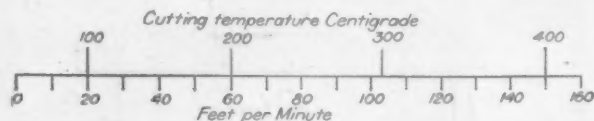


Fig. 11—Approximate Scale of Cutting Temperatures and Speeds for Tools Cutting with Water on the Tool Steel Testing Machine

ably heated under a dry cut. In machining a large forging the body of metal absorbs a great deal of heat, with only a slight rise in temperature, and the use of water has less effect on the cutting speed.

Considerable interest attaches to a comparison of the durabilities of carbon and high-speed steels. It appears from Figs. 5 and 8 that the high-speed steel has two distinct features of superiority. The speeds at which it attains its maximum durability are not very different from those at which carbon steel is most durable, but the high-speed steel is several times as durable as these speeds.

The Allied Machinery Company's Operations

Capt. G. L. Carden, general manager of the Allied Machinery Company of America, who has been abroad for many months looking after the interests of the company and extending its field of operations, will return to New York about July 1. Charles N. Thorn, assistant general manager in charge of the New York office, at 55 Wall street, sailed for Europe June 6 and will be in charge of the Paris office during Captain Carden's stay in this country. The New York office is now in charge of G. R. Woods. A representative of the company was recently sent to Venezuela in connection with prospective business there.

The company has been asked to estimate on some heavy requirements of machine tools by two large European establishments who are extending their plants and are to begin the manufacture on a large scale of Diesel engines. The equipment to be purchased will run into hundreds of thousands of dollars, and the Allied Machinery Company will bid on everything except overhead cranes. Two pleasing orders just received are for two 51-in. Niles-Bement-Pond tire boring and turning mills and two 36-in. x 17-ft. triple-gear lathes, all of which are to go to France.

Supplying Pittsburgh with Natural Gas

E. D. Leland, superintendent of compressing stations of the Philadelphia Company of Pittsburgh, supplier of natural gas, in a recent address before the Engineers' Society of Western Pennsylvania described the methods employed by his company in supplying domestic users with natural gas. He stated that it passes through the pipe lines from West Virginia to Pittsburgh at a rate of 42 miles an hour, but as it nears the city the expanded gas rises to 65.62 miles an hour. On the reliable operation of the compressing stations depends the successful delivery of the required amount of gas. A 16-in. line 100 miles long, with an initial pressure of 100 lb. at the field end and a terminal pressure of 10 lb. at the city end, would carry about 12,700,000 cu. ft. per 24 hours. A compressing station, by raising the initial pressure to 350 lb., would increase the amount to 41,300,000 cu. ft. per 24 hours. A 16-in. line 200 miles long, with an initial pressure of 350 lb. and terminal pressure of 10 lb., would give a delivery of 27,000,000 cu. ft. per 24 hours. By installing a relay station near the center of the line and restoring the pressure to the original 350 lb., the delivery capacity of such a line would be raised to 40,000,000 cu. ft. per 24 hours.

The National Gas Engine Association

The programme has been issued of the semi-annual convention of the National Gas Engine Association, which will be held at the Auditorium, Milwaukee, Wis., June 18 to 21, inclusive. The principal features of the programme are as follows:

June 18

This is a special session of the engine builders to be held in advance of the convention, and matters will be discussed of special importance:

Are we satisfied with the present freight rates being charged on gas and gasoline engines?

Are we satisfied with the present insurance restrictions, issued by the Board of Underwriters?

Is the present system of oil inspection of any particular value to us? If so, what?

Special speaker, Chester D. Barnes, attorney, Kenosha, Wis.

If we are not satisfied with the above conditions, as they exist to-day, won't a concerted action on the part of the engine builders bring about a change?

Would it not be policy to arrive at a standard form of guarantee for all combustion engines, to be known as the Association standard guarantee?

Are we in favor of industrial education?

Special speaker, H. E. Miles, Racine, Wis.

June 19

Address of welcome by Mayor Bading, Milwaukee.

Response by H. W. Bolens, Gilson Mfg. Company, Port Washington, Wis.

Report of Entertainment Committee by H. W. Bolens, chairman.

Report of Publicity Committee by P. S. Rose, Gas Review, Madison, Wis.

Report of Membership Committee by M. A. Loeb, Rock Island Battery Company, Cincinnati; Mark W. Heath, Witherbee Igniter Company, Chicago.

Paper on "The Adaptability of the Large Gas Engine in the City," by H. W. Jones, People's Gas Light & Coke Company, Chicago.

Paper on "Some Lubrication Problems," by A. E. Potter, editor Ignition-Carburetion-Lubrication, New York City.

Paper on "The Gas Producer and Its Economy," by J. N. Latta, Wisconsin Engine Company, Corliss, Wis.

Paper on "The Diesel Motor" (illustrated with lantern slides), by A. O. Krieger, Busch-Sulzer-Bros. Diesel Engine Company, St. Louis.

June 20

Reading of correspondence by Albert Stritmatter, secretary.

Routine business and announcements.

Paper on "The Storage Battery in Isolated Lighting Plants," by Taliaferro Milton, Electric Storage Battery Company, Philadelphia.

Paper on "The Farm Lighting Plant," by Otto Borchardt, J. Andrae & Sons Company, Milwaukee.

Paper on "The Mule, the Negro and the Gas Engine," by W. R. C. Smith, Southern Engineer, Atlanta, Ga.

Paper on "Something About Ignition," by H. E. Phillips, Dayton Engineering Laboratories Company, Dayton, Ohio.

Open discussion, "How Can the Dealer Best Increase His Sales?"

Paper on "The Tractor" (illustrated by moving pictures), by L. W. Ellis, M. Rumely Company, LaPorte, Ind.

June 21

Paper on "Hit-and-Miss Publicity," by E. J. Baker, Farm Implement News, Chicago.

Paper on "Publicity Through the Trade Journals and What It Means to the Manufacturer," by E. R. Shaw, president Federation of Trade Press Associations, Practical Engineer, Chicago.

Paper on "Essentials of Foreign Trade Development," by Franklin Johnston, American Exporter, New York City.

Paper on "Direct Advertising to the Dealer," by C. H. Hall, Hall-Taylor Company, Milwaukee.

Paper on "A General Publicity Campaign," by F. E. Long, Farmers' Review, Chicago.

A feature of the gathering will be an exhibition of gas engines and appliances to be held during the entire week. This exhibition will perhaps be the most comprehensive display of this class of products ever held in this country. The president of the association is O. C. Parker, La Crosse, Wis.; first vice-president, H. W. Jones, Chicago; treasurer, Otto M. Knoblock, South Bend, Ind.; secretary, Albert Stritmatter, Cincinnati, Ohio.

Owing to its increasing business in asbestos, magnesite and electrical supplies, the branch of the H. W. Johns-Manville Company at Winnipeg, Canada, has found it necessary to move into new quarters at 92 Arthur street. A building, 50 x 100 ft., six stories and basement, has been secured, which will be occupied throughout by the company's offices and store-rooms. A much larger and more complete stock will be carried than heretofore, and a larger force will be employed to look after the company's interests.

A New Wet Tool Grinding Machine

To meet the demand for a machine of larger dimensions than its 20-in. grinding machine, the J. G. Blount Company, Everett, Mass., has placed on the market an improved wet tool grinding machine. It is constructed along



A New Type of Wet Tool Grinding Machine Built by the J. G. Blount Company, Everett, Mass.

the same general lines as its predecessor, but is somewhat heavier, as the wheels are 30 in. in diameter with a 3-in. face. The machine is belt driven from a countershaft. Self-oiling bearings are used throughout and the builder's vertical centrifugal pump also forms a part of its equipment.

The following table gives the principal dimensions and specifications of the machine:

Diameter of wheel, in.	30
Face width of wheel, in.	3
Length of arbor bearings, in.	9
Diameter of arbor bearings, in.	2 1/4
Diameter of pulley on arbor, in.	9
Face width of pulley on arbor, in.	5
Height from bottom of pan to top of rest, in.	11 1/2
Diameter of tight and loose pulleys, in.	10
Face width of tight and loose pulleys, in.	5
Diameter of driving pulley on countershaft, in.	18
Face width of driving pulley on countershaft, in.	5
Length of countershaft, in.	40
Diameter of countershaft, in.	1 7/16
Speed of countershaft, r.p.m.	345
Floor space required, in.	50 x 34
Approximate net weight, lb.	1,675

Perfect Handle Drop Forged Wrenches

The H. D. Smith & Co., Plantsville, Conn., is constantly seeking new fields in which to introduce its patented Perfect Handle which is now applied to high grade wrenches, screw drivers, drawing knives, hammers, hatchets, tack claws and pry-bars; the last named being intended for removing automobile tires.

The wrench herewith illustrated is drop forged and is made with straight handle No. 642, and with off-set handle, No. 641, the process of manufacture being ingenious and never before used in making such tools. Heretofore wrenches of this type have had iron or steel handles. The wood handle is



Perfect Handle Adjustable S Wrench, No. 641

water-proofed, locked in and riveted, which with the swell at the end

offers a powerful leverage and a comfortable grip, especially in cold or hot weather. These wrenches are drop forged and have thin heads, being thus especially suitable for machinists and motorists to be used in places where an ordinary wrench is not practicable, but are equally good for general purposes. They are now made in 8-in. size, packed six in a cardboard box and six dozen in a case, other sizes being in course of preparation.

Railroad Equipment Plants in Canada

TORONTO, June 10, 1912.—With the great progress of railroad construction in Canada the development of the country's equipment manufacturing capacity has not kept pace. The railroad companies have gone on increasing their equipment plants and building new shops and equipment companies not connected with them have been rapidly increasing their annual output, but still the demand keeps ahead. With all the existing capacity of the several shops there has continued to be a shortage of equipment in operation.

The matter was brought to a crisis by the failure of the Western railroads to handle 50 per cent. of the exportable surplus of the crop before the close of navigation last year. True, lack of equipment was not the sole or even main cause. The harvest was three weeks late and the close of navigation came at least three weeks earlier than usual, so that the hauling period was greatly shortened in the year when the grain to be hauled exceeded in quantity that of any other year. But there was not enough equipment. There should have been many more locomotives and very many more cars on all three Western railroad systems.

The government is now using its influence to have the equipment much increased, and that in time to tell heavily in the coming autumn crop moving. The Board of Railway Commissioners sent out a circular letter to the several railroad companies about six weeks ago calling upon them to submit a statement of the rolling stock, motive power, sidings, etc., they would have ready for the forwarding of the next crop. On June 18 the board will hear the railroad people at Ottawa on the matter. Irrespective of government urging, the railroad companies are making large preparations to increase their equipment. It is said that the Canadian Pacific will add 20,000 or 25,000 cars and 250 locomotives to its equipment. It was recently announced officially by the Canadian Northern that it had set aside \$8,000,000 to be spent on equipment. This company has been adding to its equipment at quite a rapid rate.

The equipment companies not connected with railroads are alive to the situation and are rapidly expanding their operations. The Canada Car & Foundry Company has absorbed a number of other companies and very greatly enlarged its capacity. The Nova Scotia Car Works has completed arrangements for adding a new large plant, which is to be built at Port Arthur, Ont., as soon as possible. The head of the Great Lakes in a very important vantage point, for the demand of the Western lines for equipment will for years be practically insatiable if that region keeps up its yearly gains in agricultural production, population and volume of trade. As a matter of fact, in the next few years it is expected to advance by leaps and bounds much greater than any it has yet taken. The Grand Trunk Pacific Railway Company's shops at Transcona, near Winnipeg, will be much greater than they were originally intended to be, and those of the Canadian Pacific at Calgary, Alberta, are to be still larger. In Halifax, N. S., the Silliker car works changed hands less than two years ago and under the Nova Scotia Car Works Company have expanded. Within the past fortnight the Eastern Car Company was organized and will build steel under-frame cars. The men behind the enterprise include some of the directors of the Nova Scotia Steel & Coal Company. The works will have a capacity of 25 cars a day. A master car builder, formerly connected with the American Car & Foundry Company at Detroit, has been engaged to construct the plant and is now preparing plans. The board of directors of the Nova Scotia Car Works, Halifax, has decided to enlarge the capacity of the plant at that place and in particular to build an axle plant of the most modern description. The company's new steel car plant has a capacity of 10 cars per day. The Canadian Locomotive Company, Kingston, Ont., is making additions to its plant, and will soon be in a position to build from 15 to 18 locomotives per month.

C. A. C. J.

The Bessemer Limestone Company, Youngstown, Ohio, has re-elected officers as follows: Joseph G. Butler, Jr., chairman; John Tod, president; R. C. Steese, vice-president; C. C. Blair, secretary, and J. R. Rowlands, treasurer.

THE IRON AGE

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The Further Expansion of Demand

Repeatedly, as comment has been made on the remarkable demand upon steel works in the past six months, its ability to hold out has been questioned. It was said at first that the heavy buying of November and December had been stimulated by extremely low prices and that many buyers, jobbers in particular, had contracted for more than they could take out. Cancellations were predicted, on the theory that consumptive demand would not develop at an equal pace with the maturing of deliveries. In the early spring of this year it became apparent that material was being taken out as stipulated and that a new demand was developing sufficient to more than replace the orders the mills were filling at so rapid a rate. Then the opinion was expressed in some quarters that the new movement that came with the resumption of outdoor activity was a seasonal demand which would be followed by slackened operations with the oncoming of summer and the opening of an exciting national campaign. But steel works have increased rather than diminished their output, and while new orders have not come in in the past month at the rate of March and April there is assurance of heavy running schedules for the mills of the larger steel companies throughout the summer. In fact, the questions that have had most attention of late from those in the industry who take the longer look ahead have to do with labor supply and coke supply and the possibility that neither will be sufficient to warrant any material increase in steel production.

There is no ignoring the unsettling of business that may yet come from political surprises. While it has been commonly said that business is going ahead regardless of politics, it would be more accurate to say that the demand upon iron and steel works this year has been so largely imperative that it could not wait on the trying out of legislative issues. Certain forms of enterprise are unquestionably affected by the uncertainties that overhang the coming election, even though the belief has been growing that big business and all business has less to fear from any new legislation either party will pass than has been conjured up in two years of forebodings.

An important question which to a considerable degree waits on the election is the extent to which an expansion in the foundry trade will follow the present remarkable movement in steel products. It has happened before that the foundry industry has lagged, even when marked revival was under way in the steel trade. This was so to a very noticeable degree in the recovery that followed the minor depression of 1903 and 1904. The steel trade was quite active in 1905; foundries were not really busy until 1906. In all the years since the panic of 1907, with very considerable fluctuations in the demand for steel, the foundry trade has never been even fairly active. Much of the time it has been actually depressed. Latterly there have been signs of better conditions. The steel foundries have been doing better for some months, chiefly because of railroad buying; from the same source the malleable foundries have been getting more business. Pipe foundries have been increasingly busy and indications are that 1912 will be their best year since 1906. Gray iron foundries, whose operations are a good index to new construction for industrial purposes and additions to existing plant, have not felt the improvement in any degree comparable with the experience of the three lines mentioned. But

there is now evidence of fuller employment of machinery molders, which is reflected statistically in some further reduction of foundry pig iron stocks coincident with increased production of foundry grades. If the projectors of new enterprises and of extensions which in some measure are affected by political activity were fully assured, this one laggard branch of the iron trade might now be entering upon a period of new prosperity.

Bankers and Manufacturers' Credits

The intimation comes from important banking interests that when business again becomes exceedingly active their attitude in giving credit will be much more conservative than was the case in 1906-7. During that buoyant period every producer of manufactured goods, finding his capacity taxed to meet the demand from his trade, was striving to make the utmost out of the favorable conditions then surrounding him. At that time it is asserted that credit was extended to the extreme limit of a borrower's standing, the banks showing a disposition to assist their customers almost as freely as the latter asked for accommodation. The result was an over-extension of credits, which, coupled with over-production in many lines and excessive cost of production in nearly all, brought about the sharp decline in business from which we are now so slowly recovering. The opinion is expressed that if borrowing from the banks had been more conservative, and if business houses themselves had been more careful in their own extension of credits to their customers, the period of good times would have been longer and the decline more gradual, thus resulting in a more healthful condition generally.

The banking interests above referred to propose to use their influence in an attempt to conserve prosperity when it returns. Other bankers, however, are skeptical, stating that such an attitude is usually to be observed in times corresponding with the present. If, however, the representatives of even one-half the banking capital of the country should assume a paternally careful attitude in their relations with borrowers the influence upon the country as a whole would be beneficial. Overly enterprising manufacturers and merchants would find their disposition to exceed their financial strength kept within proper bounds. At the present time the scale of credits extended to business concerns is from 50 to 75 per cent. of realizable resources. In 1906-7, however, it is claimed that the banks extended credits far above this rate and thus a condition was brought about in which business houses were without sufficient reserve strength to endure without heavy sacrifices the abrupt business depression which followed. In the panicky conditions of the latter part of 1907 the financial stringency became acute. The weaknesses of the previous régime of excessive credits then became apparent. Undoubtedly the effects of that period of financial distress would not have been nearly so serious if business men generally had been in possession of better financial reserves of their own.

The banking interests which are now preaching the policy of conservatism in credits when trade is buoyant should also endeavor to introduce an equally beneficial policy of conservation in times of depression. The banks which freely extend credits to the limit in good times are too frequently inclined to fly to the other extreme when business declines and the country is suffering from under-consumption. Fearing that their

own condition may become affected by financial stress, they so carefully husband their resources as to build up a larger reserve than is really necessary, even for a bank. By denying to their regular customers a proper degree of credit they make conditions in their own community much more serious and depressing than would otherwise be the case. We have seen times in past periods of depression when bankers have pointed with great satisfaction to their statements showing a reserve of 50 per cent. or more. A condition of this kind would indicate that the bank was over-protecting itself at the expense of the business community which it should serve.

Bankers have it in their power to safeguard the interests of their customers at all times. While they should endeavor to keep in check those who are too ambitious to extend their business operations, on the other hand they should be particularly careful not to hamper unduly those who are conducting a sound business on proper lines. A banker needs to be a monitor to a reckless borrower, but at the same time he should not be too inflexible in his treatment of his customers in times of stress.

Two Export Movements Compared

The increase in the export iron and steel trade of the United States since the last expansive movement in the industry at home is probably greater than is generally realized. We called attention one week ago to the record exports of iron and steel in April, the total of products reported by weight being 267,210 tons, or at the rate of 3,200,000 tons a year, while our exports in 1911 were about 2,200,000 tons, or 1,000,000 tons less. It will be interesting to compare the exports in the seven months ending with April, 1910, in which our pig iron output was greater than for any other seven months, with the exports in the corresponding period two years later—the seven months ending with April of this year. This is done in the following table:

Comparison of Pig Iron Production and Iron and Steel Exports—
Gross Tons

	Pig Iron Production		Iron and Steel Exports	
	1909	1911	1909	1911
October	2,599,541	2,102,147	111,802	185,392
November	2,547,508	1,999,433	115,940	186,557
December	2,635,680	2,043,270	137,675	189,752
	1910	1912	1910	1912
January	2,606,605	2,057,911	119,094	158,773
February	2,397,254	2,100,815	110,224	203,666
March	2,617,949	2,405,318	124,753	217,991
April	2,483,763	2,375,436	117,918	267,210
For 7 months..	17,890,300	15,084,330	837,406	1,409,340

It will be seen that in the remarkable movement in the domestic iron and steel trades, which resulted in the rebuilding of stocks, after their depletion in the two years following the panic of 1907, the export iron and steel trade was at the rate of only about 1,400,000 tons a year, whereas the average in the seven months ending with April of this year was about 200,000 tons, or 2,400,000 tons a year. Pig iron production in the first-named period was nearly 16 per cent. more than in the seven months ending with April, 1912; but exports in the second seven months period were 68.4 per cent. more than in the first seven months period covered by the table. There was no such general demand for iron and steel throughout the world two years ago as is now filling the mills of the leading

exporting countries, and the United States was not then doing as large a proportion of the export business as it has done in the past six months. No small factor in this more recent expansion of our export iron and steel trade is the demand from Canada, whose prosperity seems unabated and whose railroad building promises to make further demands upon the rail mills of the United States not only this year but next year.

Correspondence

Cases of Manufacturing Inefficiency

Inattention to Easily Remedied Conditions—Home-Made Tools

To the Editor: When the writer is commissioned to reduce costs of manufacture, the proprietor usually expects to see a very large saving on some one thing. He is rather disappointed if at least \$100 cannot be saved at one fell swoop. The same amount saved in several operations is not so satisfactory.

I have in mind one client who ran a well-organized manufacturing plant. It would compare well with any I ever saw, so far as the shop work went, but I found the upkeep of the buildings very high. One wall had been regularly repaired for six years. It was next the engine room. The total charge had run up to \$285. I bought an exhaust head for \$33, erected it for \$10.80 and put a stop to the yearly mason bill. I gave the hands warm water for washing, by leading the condensed steam to the washing tanks. There were reasons why this steam could not be used for heating purposes. The proprietor knew that there were such things as exhaust heads and what they were for, but he had never given the necessary thought to the cause of his mason bill. It was not the lack of intelligence but failure to appreciate the matter. I had great difficulty in persuading him that a large saving of oil could be made by the use of an oil extractor, that it paid for itself in three months. He never ordered the belts off for cleaning, and he was very much surprised at the dirt removed.

Another customer melted babbitt metal in an open ladle all day long, three days a week, using the blacksmith's fire with annoying contamination of the air. He knew there were melting pots on the market and that it was a bad thing to have the tool dresser bothered, yet he had never thought it worth his time to look into their value.

The finished product of a shop was rolled half its length by the machinists who erected it. A portable crane costing less than \$50 with a laborer to push it along, cut out the time of four machinists doing laborers' work. Also, the same crane loaded the planing and boring machines without scratching and banging the tables out of shape and removed the finished work without danger to the men.

One mental condition is almost always found to exist among foremen, as to making tools, such as taps, reamers, etc. There is a very nice grinder in the tool room and why should it not be used, they argue. The steel is accordingly cut off and annealed, centered and turned up and then there is a discussion as to how many flutes are to be put in it. It has been left 0.006 in. large and when hardened it has sprung so that there is one spot where it does not clean up. After it is all ground it is discovered that the head has not been squared and that it has not been marked, and then the toolmaker has to stone it to make it cut. If the real cost of the reamer had been kept it would have amounted to at least four times the cost of one ordered from a concern which does nothing else save this kind of work. There is no virtue in a home-made tool; it is simply vanity, which costs money, that permits small tools to be made in a general or manufacturing shop.

It took a long time to prove to a company that planing a keyway in a 2-in. shaft in a planer that could take material 4 ft. square and 12 ft. long was a losing game. The case would not have been so bad if the job had been one only done now and then, but it was work which was done all the time and there were four good millers at hand

which could be used. The excuse was that the milling cutters cost a lot of money and were hard to grind and did not keep their size, but the real reason was that no cost was kept of the planing, and when I took the work in hand and kept the cost, the figures settled the matter.

W. D. FORBES, M.E.

NEW YORK CITY.

April Iron and Steel Exports

Through an error in the table of iron and steel exports for April, as printed in *The Iron Age* of last week, the total for the month was made less than it should have been. The month's figures as printed showed 257,975 gross tons of exports of commodities whose weights are given, whereas the correct figures are 267,210 tons, thus making the month's huge record still larger than was then stated.

The Alberger Pump & Condenser Company

The Alberger Pump & Condenser Company, 140 Cedar street, New York, in which have been combined the Alberger Condenser Company, Alberger Pump Company and Newburgh Ice Machine & Engine Company, has chosen officers as follows: George Q. Palmer, president; William S. Doran and D. H. Chester, vice-presidents; William R. Billings, secretary and treasurer. Announcement is made that the large volume of condenser and centrifugal pump business in hand has necessitated additions to the buildings and equipment of the company's works at Newburgh, N. Y. Important orders are being executed for the United States Navy Department, Isthmian Canal Commission, United States War Department, American Gas & Electric Company, Public Service Corporation of New Jersey, Cleveland Electric Illuminating Company, Robin's Dry Dock & Repair Company and many other large corporations in this country and its dependencies. The line of apparatus manufactured by the company consists of surface, jet and barometric condensers of various designs, cooling towers, a complete line of volute and turbine type centrifugal pumps, steam turbines, feed water heaters, hot water service heaters and expansion joints.

The Alabama Consolidated Case

Hearing on the restraining order issued by the United States District Court at Baltimore last week to prevent the Baltimore Trust Company from selling \$1,250,000 bonds of the Alabama Consolidated Coal & Iron Company was set for June 12. The bonds were held by the trust company as collateral for notes of \$330,000. The company and Joseph H. Hoadley are joint complainants. It is alleged that a conversion by which holders of preferred stock amounting to \$1,200,000, or 50 per cent. of all the preferred stock outstanding, exchanged their preferred stock for an equal amount of bonds, of which \$510,000 worth was sold, was contrary to the laws of New Jersey. It is claimed that this conversion likewise raised the annual interest charge from \$29,400 to \$62,500.

The Newark Gear Cutting Machine Company, Newark, N. J., has again found it necessary to expand its works, to take care of increasing business. The assembly room has been enlarged so that the main building now extends from 66-68 Union street through to 67-69 Prospect street. The three-story brick building at 69 Prospect street is now occupied by the offices, drawing-room and pattern shop while such portions of the main building as were formerly occupied by these departments will now be given over to the machine shop. The address of the office is now 69 Prospect street, Newark, N. J. Henry E. Eberhardt, president of the company, reports that at present the plant is running at normal time, with full working force. The demand for gear-cutting machines has been increasing, especially for Eastern trade.

The production of 57,738 tons of basic iron in May by five furnaces of the Ensley group of the Tennessee Coal, Iron & Railroad Company was a record for a single month. It was not quite equal, however, reckoned as output per furnace per day, to the record of September, 1911, when 56,041 tons was made by five furnaces in 30 days. This figures out 373.5 tons per day per furnace, against an average of 372.5 tons last month.

The Newark Foundrymen's Association

At the meeting of the Newark Foundrymen's Association, held June 5 in Newark, N. J., at the close of which adjournment was taken until next fall, the speaker of the evening was Charles Pettinos, of Pettinos Brothers, Bethlehem, Pa., and 30 Church street, New York, who had for his subject "Plumbago." Mr. Pettinos treated his topic in a broad way, referring to the ancient uses of graphite, its various forms, where found, how mined and refined and its uses to-day, with reference to its value in lubrication and as a facing for molds in the making of castings. His address was made more interesting by a number of photographs of the methods, pursued by the natives of Ceylon, mostly women and girls, in working the plumbago deposits on that island. He also exhibited samples of various grades of the material. His firm is now operating in Ceylon, Mexico and Pennsylvania and has worked deposits in other parts of the world. Among the interesting things he said, while touching on the general uses of plumbago, was that practically all of the pencil stock known as "Siberian" comes from Mexico, but that there are rich deposits of plumbago in Siberia which probably will dominate the black lead supply when they are properly developed. The material is found in many parts of the world, but the greater part of the deposits are useless because of the high percentage of impurities found in them and the difficulty in profitably separating the plumbago from such detrimental substances as sand and silica. Fortunes had been sunk in graphite beds, he said, which were successfully worked until the pockets of rich material were exhausted, after which came disaster.

A business meeting of the association was held with President G. Hannay in the chair. Special pleas were made by Franklin Phillips, of the Hewes & Phillips Iron Works and former president of the association, and Secretary Arthur E. Barlow, of the Barlow Foundry Company, for more ardent support of the Newark Technical School and particularly of the class in foundry practice by the members of the association. The class was conducted last season by George Heggie and five students attained 100 per cent. in attendance, having been in class four nights of every week during the entire school season. The matter of more thoroughly directing the attention of apprentices and journeymen to the value of the foundry class and also of devising incentives to promote regular attendance and diligence in study on the part of the students was intrusted to the executive committee of the association with power to act. The suggestion was made, and it is probable that it will be carried out, that the members post suitable notices in their shops and foundries and also offer prizes for meritorious work. Mr. Phillips has just been reappointed a trustee of the school by Governor Wilson, of New Jersey.

To permit of an extension to the activities of the association the members voted unanimously to advance the dues from \$12 to \$16 a year.

The following were elected to membership: J. W. Paxson Company, Philadelphia; Cleveland Osborn Mfg. Company, New York; Snead & Co. Iron Works, Jersey City, N. J., and B. W. Wallace, Brooklyn, N. Y.

The Philadelphia Foundrymen's Association

The regular monthly meeting of the Philadelphia Foundrymen's Association was held at the Hotel Walton, in that city, on the evening of June 5, with President Thomas Devlin in the chair. Following routine business, the Burr & Houston Company, iron founder, Brooklyn, N. Y., represented by J. A. Rylance, was elected to membership. The recent sudden death of Thomas G. Smith, of the Midvale Steel Works, who was active in the association's work, was feelingly alluded to by Secretary Howard Evans and other members.

Plans were considered for securing the attendance of a large delegation at the convention of the American Foundrymen's Association to be held in Buffalo in September. President Devlin appointed a committee consisting of Dr. E. E. Brown, A. A. Miller and Howard Evans, to make the necessary arrangements. The paper of the evening was on "First Aid to the Injured," by H. A. Lack, of Johnson & Johnson, New Brunswick, N. J. Mr.

Lack made a very interesting address, illustrating his various points by means of samples of his company's first aid outfits. The association then adjourned for its usual summer vacation, the next meeting to be held September 4.

The Merchant & Evans Company to Expand

Powell Evans, president Merchant & Evans Company, Philadelphia, Pa., has consummated the purchase of 15 acres of land adjacent to Glenova, suburb of Wheeling, W. Va., and located on the Ohio River and the Pennsylvania Railroad, and a tract in the Pittsburgh main coal seam alongside, containing 1,250,000 tons of coal. It is the intention of the company to remove its tinplate dipping plant and possibly some associate departments from their present location in Philadelphia to the new site. A large steel building on the land, formerly the property of the West Virginia Bridge Company, has been acquired and the equipment of the plant will go forward as rapidly as possible. Early in the coming fall it is expected that the building and equipment will be ready for operation. A good share of the general equipment will be moved from the Philadelphia plant, although power and other machinery necessary will be purchased. The production of the new plant will, it is stated, run between 300,000 and 400,000 base boxes of tin andterne plates per annum.

It is the intention of the Merchant & Evans Company to use the portion of the Philadelphia plant thus vacated for extensions to its machine shop for the mechanical department of its business, particularly the manufacture of the Hele-Shaw clutch, for which there has been an exceptionally large demand, approximately 500 trucks of different makes being equipped with this clutch monthly. A portion of the increased machine shop will also be used for the manufacture of alignment joints and transmissions for automobile work. The company is not only a manufacturer and importer of tinplate, but also does a large business in anti-friction metal, solders, pressed steel tire cases and automobile parts, etc., with branch establishments in various portions of the country.

Steel Corporation Orders, 5,750,983 Tons

The statement of unfilled orders of the United States Steel Corporation on May 31, as published Monday, June 10, showed a total of 5,750,983 tons, a gain of 86,098 upon the total for April 30. A further approach was thus made in May toward the total of 5,927,031 tons at the close of 1909, when the restocking movement of late 1909 and early 1910 was at its height. Between January 1 and April 1, 1910, however, the total fell to 5,402,514 tons, or less than at the end of April and May of this year. The monthly statements, beginning with January are as follows:

May 31, 1912.....	5,750,983	August 31, 1911.....	3,695,985
April 30, 1912.....	5,664,885	July 31, 1911.....	3,584,085
March 31, 1912.....	5,304,841	June 30, 1911.....	3,361,058
February 29, 1912.....	5,454,200	May 31, 1911.....	3,113,187
January 31, 1912.....	5,379,721	April 30, 1911.....	3,218,704
December 31, 1911.....	5,084,761	March 31, 1911.....	3,447,301
November 30, 1911.....	4,141,955	February 28, 1911.....	3,400,543
October 31, 1911.....	3,694,328	January 31, 1911.....	3,110,919
September 30, 1911.....	3,611,317		

The totals at the close of the various years have been as follows: 1902, 5,347,523 tons; 1903, 3,215,123 tons; 1904, 4,696,203 tons; 1905, 7,605,086 tons; 1906, 8,498,719 tons (the high record); 1907, 4,624,552 tons; 1908, 3,603,527 tons; 1909, 5,927,031 tons; 1910, 2,674,757 tons; 1911, 5,084,761 tons.

The blast furnace of the Empire Steel & Iron Company, at Oxford, N. J., was blown in June 7. The wand used by Miss Constance Brown in applying the fire was decorated with the colors of Michigan University, from which her father, the late Archer Brown, of Rogers, Brown & Co., graduated in 1872. The furnace has been out of blast nearly a year; meantime repairs have been made and improvements completed.

The Dodge Mfg. Company, power transmission machinery, Mishawaka, Ind., shortly after June 15 will combine its New York office and Brooklyn warehouse in new quarters at 21 Murray street, New York City. The entire building is now being refitted for that purpose. S. A. Emery is manager.

The Iron and Metal Markets

Heavy Steel Shipments in June Furnace Coke Contracts at Lower Prices More New Construction at Steel Works—Rail Bookings Well Beyond 1911—Foundry Operations Somewhat Larger

Conditions in the steel trade favor a continuance through the summer of the present large scale of mill operations, with an advancing tendency in prices. Reports that an advance of \$1 a ton on some of the heavier finished forms will be made July 1 may or may not represent the views of producers. They will at least be a stimulus to specifications in June, which promises to show very heavy shipments to save cancellations on low priced contracts expiring with this month.

Consumers have to reckon with some reduction of output in July and August due to the heat; further, the losses of iron and steel works employees to railroad and other construction work paying higher wages, already a matter of some concern, will then be more serious. Coke production in the summer is apt to suffer for the same reason.

The strain in the coke situation has been relieved for a time, at least, and prices for both prompt and contract furnace coke are lower. A sale of 15,000 tons a month for the last half has been made at \$2.25 at oven and one of 5000 tons a month at \$2.15. Sales by an Eastern dealer are reported at \$2.10 for the second half.

Sustained buying of rails has raised a question as to deliveries and it is certain that some track work planned for summer months will go over to late fall, if it can be done at all this year. Rail bookings thus far for 1912 are considerably larger than at this time last year. The Oregon Short Line has taken 12,000 tons in the past week and the St. Paul 15,000 tons additional. The Grand Trunk Pacific has placed 10,000 tons in this country and the Canadian Pacific is negotiating for 15,000 tons.

New buying of sheets has been a feature, one manufacturing interest placing 10,000 tons and another 12,000 tons. The sheet mills of the leading producer have orders ahead for six months and its tin plate mills are booked into December.

Bar mills have two or three months work ahead on present specifications and reinforced concrete work is still making large demands. At Chicago bar iron is \$1 a ton higher.

Muck bar iron products are firm in view of the demand of the Sons of Vulcan for a flat puddling rate of \$6 a ton. Under the new Amalgamated scale a \$6 puddling rate would not be paid until bar iron reached 1.25c. per lb.

Contracts are yet to be placed in the East for four new vessels intended for the South American west coast trade. Eastern shipyards are inquiring further for plates and shapes. All but one are filled up for nearly a year. Eastern plate mills, since those in the Central West are so well sold up, have been doing more business there, delivering plates in Cleveland at \$2 a ton

above the delivered price for Pittsburgh plates. In a few cases Pittsburgh mills have got a premium of \$1 a ton for early shipment.

Pittsburgh and Chicago report that low prices by fabricators are less common. Bids have gone in on 11,000 tons for the Adams Express Company building, New York, and 6000 to 7000 tons for the C. & O. coal pier at Newport News.

The building of new capacity goes on in earnest. The Republic Iron & Steel Company announces a \$2,000,000 programme including four merchant mills at Youngstown and a by-product coke plant at Haselton increasing its coke capacity by 70 per cent. The Steel Corporation this week made an appropriation for new hoop mill construction in the Pittsburgh district.

Pig iron has been more active in the East, but quiet elsewhere. In Eastern Pennsylvania further sales of 20,000 tons of basic iron are reported for third and fourth quarter delivery, the latter being at \$15.25. In the Harrisburgh district three steel works blast furnaces will go in this month.

In foundry iron the largest sale was 10,000 tons to a New Jersey interest making light gray iron castings. Higher prices are quoted on foundry grades in Eastern Pennsylvania. At Cleveland, which has been a low market, No. 2 iron has advanced to \$13.50. Gradually decreasing pig iron stocks at furnaces, with increasing production of foundry iron, point to larger operations in the foundry trade. Several demands for higher wages for molding are another indication.

While copper has been rising in the past six months contract work has been hurried into brass foundries and mills under the incitement of higher prices yet to come. In certain supplies wants have thus been anticipated to such an extent that some slackness would not be surprising.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	June 12, 1912.	June 5, 1912.	May 15, 1912.	June 14, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2 standard, Philadelphia	\$15.25	\$15.25	\$15.25	\$15.00
Foundry No. 2, Valley furnace	13.25	13.25	13.25	13.50
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	13.50
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	10.25
Foundry No. 2, at furnace, Chicago	14.50	14.50	14.50	15.00
Basic, delivered, eastern Pa.	15.25	15.25	15.00	14.50
Basic, Valley furnace	13.00	13.00	13.00	13.10
Bessemer, Pittsburgh	15.15	15.15	15.15	15.90
Malleable Bessemer, Chicago	14.50	14.50	14.50	15.00
Gray forge, Pittsburgh	13.90	13.90	13.90	13.90
Lake Superior charcoal, Chicago	16.25	16.25	15.75	17.00
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	20.50	21.00	21.00	21.00
Open hearth billets, Pittsburgh	20.50	20.50	20.50	21.00
Forging billets, Pittsburgh	28.00	28.00	27.00	26.00
Open hearth billets, Philadelphia	23.40	23.40	23.40	23.40
Wire rods, Pittsburgh	25.00	25.00	25.00	29.00

Old Material, Per Gross Ton:				
Iron rails, Chicago	16.00	16.00	16.00	14.00
Iron rails, Philadelphia	16.50	16.50	16.50	16.50
Car wheels, Chicago	14.25	14.25	14.00	12.50
Car wheels, Philadelphia	13.50	13.50	13.50	13.00
Heavy steel scrap, Pittsburgh	13.50	13.25	13.25	12.75
Heavy steel scrap, Chicago	12.00	12.00	11.75	10.25
Heavy steel scrap, Philadelphia	13.50	13.50	13.50	13.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel.

June 12, June 5, May 15, June 14,
1912. 1912. 1912. 1911.

Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.30	1.30	1.30	1.27½
Iron bars, Pittsburgh.....	1.25	1.25	1.25	1.25
Iron bars, Chicago.....	1.27½	1.25	1.25	1.20
Steel bars, Pittsburgh.....	1.20	1.20	1.20	1.25
Steel bars, tidewater, New York	1.36	1.36	1.36	1.41
Tank plates, Pittsburgh.....	1.25	1.25	1.25	1.35
Tank plates, tidewater, New York	1.41	1.41	1.36	1.51
Beams, Pittsburgh.....	1.25	1.25	1.25	1.35
Beams, tidewater, New York....	1.41	1.41	1.36	1.51
Angles, Pittsburgh.....	1.25	1.25	1.25	1.35
Angles, tidewater, New York....	1.41	1.41	1.36	1.51
Skelp, grooved steel, Pittsburgh	1.20	1.15	1.15	1.30
Skelp, sheared steel, Pittsburgh	1.25	1.20	1.20	1.35

Sheets, Nails and Wire.

Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	1.90	1.90	1.90	2.00
Wire nails, Pittsburgh.....	1.60	1.60	1.60	1.80
Cut nails, Pittsburgh.....	1.55	1.55	1.55	1.60
Fence wire, ann'led, 0 to 9, P'gh.	1.40	1.40	1.40	1.60
Barb wire, galv., Pittsburgh....	1.90	1.90	1.90	2.10

Coke, Connellsville.

Per Net Ton, at Oven:	Cents.	Cents.	Cents.	Cents.
Furnace coke, prompt shipment	\$1.90	\$2.10	\$2.25	\$1.40
Furnace coke, future delivery..	2.25	2.35	2.25	1.60
Foundry coke, prompt shipment	2.40	2.40	2.50	1.75
Foundry coke, future delivery..	2.40	2.50	2.40	2.15

Metals, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	17.50	17.25	16.25	12.75
Electrolytic copper, New York	17.37½	17.12½	16.00	12.50
Spelter, St. Louis.....	6.75	6.75	6.70	5.32½
Spelter, New York.....	6.90	6.90	6.85	5.55
Lead, St. Louis.....	4.37½	4.12½	4.05	4.30
Lead, New York.....	4.50	4.20	4.20	4.45
Tin, New York.....	47.37½	45.75	46.12½	46.87½
Antimony, Hallett, New York..	7.87½	7.85	7.62½	8.75
Tin plate, 100-lb. box, New York	\$3.64	\$3.64	\$3.54	\$3.94

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.25c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square ft. to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot, down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$25. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.40; galvanized, \$1.70. Galvanized barb wire, to jobbers, \$1.90; painted, \$1.60. Wire nails, to jobbers, \$1.60.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras Nos. 10 to 16, which are added to the base price:

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed.....	\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10
Galvanized....	1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in., on one or both legs, ¼ in. and over, 1.25c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.30 to 1.35
H-beam over 18 in.....	1.30 to 1.35
Angles over 6 in.....	1.30 to 1.35
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909.....	1.30 to 1.35
Tees, 3 in. and up.....	1.30 to 1.35
Zees, 3 in. and up.....	1.25 to 1.30
Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909.....	1.30 to 1.35
Deck beams and bulb angles.....	1.55 to 1.60
Hand rail tees.....	2.10 to 2.25
Checkered, trough and corrugated floor plates..	2.25 to 2.50

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 2 ft., inclusive.....	.25
Under 2 ft., to 1 ft., inclusive.....	.50
Under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows:

Blue Annealed Sheets.	Cents per lb.
Nos. 3 to 8.....	1.25 to 1.30
Nos. 9 and 10.....	1.39 to 1.40
Nos. 11 and 12.....	1.40 to 1.45
Nos. 13 and 14.....	1.45 to 1.50
Nos. 15 and 16.....	1.55 to 1.60

Box Annealed Sheets, Cold Rolled.

Nos. 10 to 12.....	1.55 to 1.60	
Nos. 13 and 14.....	1.60 to 1.65	
Nos. 15 and 16.....	1.65 to 1.70	1.75 to 1.80
Nos. 17 to 21.....	1.70 to 1.75	1.80 to 1.85
Nos. 22, 23 and 24.....	1.75 to 1.80	1.85 to 1.90
Nos. 25 and 26.....	1.80 to 1.85	1.90 to 1.95
No. 27.....	1.85 to 1.90	1.95 to 2.00
No. 28.....	1.90 to 1.95	2.00 to 2.05
No. 29.....	1.95 to 2.00	2.05 to 2.10
No. 30.....	2.05 to 2.10	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11.....	1.90 to 2.00
Nos. 12, 13 and 14.....	2.00 to 2.10
Nos. 15 to 16.....	2.10 to 2.15
Nos. 17 to 21.....	2.30 to 2.40
Nos. 22, 23 and 24.....	2.40 to 2.50
Nos. 25 and 26.....	2.60 to 2.70
No. 27.....	2.75 to 2.85
No. 28.....	2.90 to 3.00
No. 29.....	3.00 to 3.10
No. 30.....	3.20 to 3.30

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice, as also are the following:

Corrugated Roofing Sheets by Weight.

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., as announced by most of the leading sheet manufacturers, are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

	Gauges, per 100 lb.			
	29	25 to 28	19 to 24	12 to 18
Painting.				
Regular or oiling.....	0.15	0.10	0.05	0.05
Graphite, regular.....	0.25	0.15	0.10	0.10
Forming.				
2, 2½, 3 and 5 in. corrugated.....	0.05	0.05	0.05	0.05
2 V-crimped, without sticks..	0.05	0.05	0.05	0.05
¾ to 1½ in. corrugated.....	0.10	0.10	0.10	0.10
3 V-crimped, without sticks..	0.10	0.10	0.10	0.10
Pressed standing seam, with cleats.....	0.15	0.15	0.15	0.15
Plain roll roofing, with or without cleats.....	0.15	0.15	0.15	0.15
Plain brick siding.....	0.20	0.20	0.20	0.20
3-15 in. crimped.....	0.20	0.20	0.20	0.20
Weatherboard siding.....	0.25	0.25	0.25	0.25
Beaded ceiling.....	0.25	0.25	0.25	0.25
Rock face brick and stone.....	0.25	0.25	0.25	0.25
Roll and cap roofing, with caps and cleats.....	0.25	0.25	0.25	0.25
Roofing valley, 12 in. and wider.....	0.25	0.25	0.25	0.25
Ridge roll and flashing (plain or corrugated).....	0.65	0.65	0.65	0.65

Corrugated Roofing Sheets, with 2½-in. Corrugations, per Square. Some leading manufacturers of roofing material are

still quoting on an area basis and are naming prices as follows:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29.....	.....	\$2.40	23.....	\$2.30	\$3.50
28.....	\$1.35	2.55	22.....	2.50	3.80
27.....	1.50	2.60	21.....	2.70	4.05
26.....	1.60	2.65	20.....	2.90	4.35
25.....	1.80	3.05	18.....	2.90	5.70
24.....	2.00	3.15	16.....	4.70	6.50

Wrought Pipe.—The following are the jobbers' carload discounts (card weight) on the Pittsburgh basing card on steel pipe, in effect from June 1, 1912; black iron pipe from December 1, 1911; galvanized iron pipe from March 1, 1912, one point greater being allowed on merchant weight:

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
¾ and ¾ in.....	73	53	68	49
¾ in.....	74	64	69	53
¾ in.....	77	67	72	59
¾ to 1½ in.....	80	72	75	64
2 to 3 in.....	81	74	76	65

Lap Weld.				
1½ and 1½ in.....	..	..	68	61
2 in.....	78	71	72	63
2½ to 4 in.....	80	73	74	66
1½ to 6 in.....	79	71	73	65
7 to 12 in.....	78	68	71	61
13 to 15 in.....	55	..	47	..

Plugged and Reamed.				
1 to 1½ in., butt weld.....	78	70	73	62
2 to 3 in., butt weld.....	79	72	74	63
2 in., lap weld.....	76	69	70	61
2½ to 4 in., lap weld.....	78	71	72	64

Butt Weld, extra strong, plain ends, card weight.				
¾, ¾, ¾ in.....	69	59	65	55
¾ in.....	74	68	70	63
¾ to 1½ in.....	78	72	74	65
2 to 3 in.....	79	73	75	66

Lap Weld, extra strong, plain ends, card weight.				
1½ in.....	..	..	66	60
2 in.....	75	69	71	63
2½ to 4 in.....	77	71	73	66
4½ to 6 in.....	75	70	72	65
7 to 8 in.....	70	60	65	55
9 to 12 in.....	65	55	60	50

Butt Weld, double extra strong, plain ends, card weight.				
¾ in.....	64	58	60	52
¾ to 1½ in.....	67	61	63	55
2 to 2½ in.....	69	63	65	57

Lap Weld, double extra strong, plain ends, card weight.				
2 in.....	65	59	61	52
2½ to 4 in.....	67	61	63	57
4½ to 6 in.....	66	60	62	56
7 to 8 in.....	60	50	55	45

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		Standard Charcoal Iron.	
1½ to 2½ in.....	64	1½ in.....	48
2½ in.....	66½	1¾ to 2½ in.....	50
2½ to 3½ in.....	71½	2½ in.....	57
3½ to 4 in.....	74	2½ to 3½ in.....	55½
5 to 6 in.....	66½	3½ to 5 in.....	60
7 to 13 in.....	64	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Pittsburgh

PITTSBURGH, PA., JUNE 12, 1912.

Specifications this month against contracts are likely to beat all records, especially in bars, plates and shapes. Several of the leading makers of heavy rolled products are practically out of the market, their present commitments being sufficient to take their entire output up to October. The whole market on finished products looks very strong, and there are persistent reports of an advance of \$1 a ton on bars, plates and shapes to come not later than July 1. A few lines that are out of season, such as wire and tin plate, are quiet and specifications for wire and wire nails are not heavy enough to give the mills full work. The development of the week is the break in the price of furnace coke,

and how far this may affect the pig iron market has not yet been determined. Two weeks ago coke was one of the strongest items on the whole list, but the situation has changed, and while present conditions may be only temporary, there is now a surplus of coke and prices on furnace coke both for prompt delivery and for last half are lower. The pig iron market continues to drag and prices show no signs of early betterment. Stocks of pig iron are being rapidly depleted, but with the output running at the rate of 30,000,000 tons per year consumers feel they will be able to get iron when they want it and are not anxious at the moment to buy ahead. The semi-finished steel market is very strong with a decided scarcity in billets and sheet bars for early delivery. Nearly all the mills are oversold and back in shipments. Mills are watching contracts closely, and where buyers are not specifying for the material promptly there have been cancellations. In the wire trade some leniency is being shown, but this is the exception. The long expected demand seems to be here, and the steel makers are confident that present conditions are assured up to October 1, and probably for the rest of the year. Any increase in the present output of steel and hot rolled products is practically impossible, as the steel business is working on a 95 per cent. basis and still there is not enough to go around. The demand of the Sons of Vulcan for a \$6 flat rate for puddling is causing some easiness in iron circles; with the present scarcity in labor, the men are better fortified to stand out for this rate than otherwise would be the case. The general labor situation is giving employers a good deal of concern as the scarcity of workmen is interfering with output in some lines to considerable extent.

Pig Iron.—The easing off in prices of prompt and forward delivery furnace coke may have the effect of still further delaying the expected advance in prices of pig iron which seem no nearer now than at any time in the past several months. New inquiry is light, and while consumers have a fair amount of iron bought for delivery over the next two or three months they do not seem inclined to cover their requirements for last half. There is one thing that would do much to bring about a better situation in pig iron and possibly higher prices, and that is a large purchase of iron by the Steel Corporation. There have been reports from time to time that the corporation would buy large tonnages of basic or Bessemer iron but it has not bought any pig iron since its purchase of 15,000 tons of Bessemer iron about a month ago from the Brier Hill Steel Company. The stocks of pig iron held by the Steel Corporation interests are light and a purchase of iron by it at any time would not be a surprise. The Pittsburgh Steel Company has not yet covered for its July basic iron but is expected to buy from 10,000 to 12,000 tons before this month is out. Prices on basic iron are a little firmer and some furnaces are asking \$13.25 to \$13.50 for last half delivery. A sale is reported of 8000 to 9000 tons of basic for third quarter at about \$13, Valley furnace, and a sale of 500 tons of prompt basic has been made at the same price. There are also reports of sales of 500 to 600 tons of Bessemer iron at a shade under \$14.25 at furnace. New inquiry for foundry iron is only fair, but prices are firm. We quote standard Bessemer iron at \$14.25 to \$14.50; basic, \$13 to \$13.25; malleable Bessemer, \$13 to \$13.25; No. 2 foundry, prompt delivery, \$13.25, and for last half, \$13.50; gray forge, \$13, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—A further purchase from outside mill of 2000 to 3000 tons of sheet bars has been made by the American Sheet & Tin Plate Company which is still unable to get deliveries of bars fast enough from the Carnegie Steel Company to meet its requirements. The Jones & Laughlin Steel Company and the Carnegie Steel Company have not sold any steel in the open market for a long time, but the Pittsburgh Steel Company, which has an open-hearth plant at Monessen, Pa., is selling open-hearth billets, its entire output not being required by its rod and wire mills, which are not operating full time. We quote Bessemer and open-hearth billets \$20.50 to \$21; Bessemer and open-hearth sheet bars \$21.50 to \$22; axle billets, \$25; forging billets to be used for general forging purposes, \$28, all f.o.b. cars Pittsburgh or Youngstown.

Ferroalloys.—The scarcity in supply of ferromanganese for prompt shipment is still as great as ever, but consumers appear to have covered their immediate wants and new inquiry is not as heavy as it has been. Several large consumers are reported to have inquiries out for their supply of ferromanganese for first half and over all of 1913, and several large contracts have been made. For prompt shipment anywhere from \$50

to \$55 can be obtained, a carload having sold last week at \$52 and another lot of 50 tons at \$53. We quote 80 per cent. ferromanganese at \$48.50, Baltimore, for future delivery, and from \$50 to \$55 in small lots for prompt shipment. The market on ferrosilicon is very strong, but the talk of higher prices has quieted down. Sales of carloads and up to 50 and 75 tons are being made at the full price of \$70 delivered. We quote 50 per cent. ferrosilicon in lots up to 100 tons at \$70; over 100 tons to 600 tons, \$69, and over 600 tons, \$68, Pittsburgh. The lower grades are ruling at about \$30 for 10 per cent.; \$21 for 11 per cent.; \$22 for 12 per cent., f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio. On ferrotitanium we quote 8c. per lb. for carload lots; 10c. per lb. in 2000-lb. lots and over, and 12½c. per lb. in lots up to 2000 lb.

Wire Rods.—The market continues quiet and the expected inquiries for Bessemer and open-hearth rods from consumers whose contracts expire on June 30 have not yet developed except in one or two cases. Last year consumers whose contracts expired on June 30 did not come in the market until July and that may be the case this year. The price on rods is only fairly strong and it is said that one mill is shading the recognized price about 50c. a ton. We quote Bessemer, open-hearth and chain rods at \$25 to \$25.50, Pittsburgh.

Muck Bar.—Quite an active new demand for muck bar has come in the past week, one leading consumer asking for 4000 tons for third quarter, but so far as known, the contract has not been placed. Local makers of muck bar who are sometimes sellers in the open market, are now holding their bar for their own use in the belief that possibly there may be a shut down of the puddling mills that sign the Sons of Vulcan scale. One local consumer has recently bought a round tonnage of muck bar in the East for Pittsburgh delivery at about \$29 delivered here. The local market is strong, and we quote best grades of muck bar made from all pig iron at \$29.50, Pittsburgh.

Skelp.—There is quite a heavy new demand for both iron and steel skelp, particularly for iron, and prices have shown a sharp advance. A local consumer has bought about 1500 tons of grooved steel skelp at about 1.20c., delivered Pittsburgh. We have advanced prices and now quote grooved steel skelp at 1.20c.; sheared steel skelp, 1.25c.; grooved iron skelp, 1.65c. to 1.70c., and sheared iron skelp 1.70c. to 1.75c., delivered buyer's mill in the Pittsburgh district.

Steel Rails.—The demand for standard sections and light rails is fairly heavy. The Carnegie Steel Company has booked several contracts for standard sections ranging from 1000 to 2500 tons and has also taken some fairly large export orders. A good part of the tonnage being rolled at the Edgar Thomson mills at present is for export. In the past week the Carnegie Company received new orders and specifications against contracts for over 3000 tons of light rails. We quote splice bars at 1.50c. per lb. and rails as follows: Standard sections, 1.25c. per lb.; 8 and 10-lb. light rails, 1.29½c.; 12 and 14-lb., 1.20c.; 16 and 20-lb., 1.15c.; 25, 30, 35, 40 and 45-lb., 1.10c., in carload lots, f.o.b. Pittsburgh.

Structural Material.—New inquiries are heavy and the outlook is regarded as very bright. Local structural concerns have more actual orders on their books than at any time in some months. The McClintic-Marshall Construction Company has taken 8000 tons for transmission bridges for the electrification of the New York, New Haven & Hartford Railroad, 600 tons for new mill buildings for the Apollo Steel Company, Apollo, Pa., 500 tons for a new power house for the Republic Railway & Power Company at Lowellville, Ohio, and 1350 tons for a bridge over the Grand River for the Michigan Central. The American Bridge Company has taken a good deal of work, including 2200 tons of bridge work for a Western road, 1400 tons for a hotel building in the East and other smaller contracts. The Fort Pitt Bridge Works has taken 300 tons for a bridge for the Atlantic Coast Line. Local interests are bidding on 14,000 tons of material for new buildings for the Adams Express Company and bids have gone in on 7000 tons for a new coalpier for the Chesapeake & Ohio Railroad at Newport News, Va. Local fabricators report that they are getting slightly better prices, and several concerns are so well filled up they are passing up some work without bidding on it. Another advance of \$1 a ton in shapes is looked for by July 1. We quote beams and channels up to 15 in. at 1.25c., Pittsburgh.

Plates.—The Pennsylvania Lines East, the Balti-

more & Ohio, the Seaboard Air Line and other roads are quietly feeling the market for upward of 25,000 cars, and some of these orders are expected to develop before the month ends. The Canadian Pacific is also reported in the market for a large number of freight cars and for 250 locomotives. The St. Louis & San Francisco has placed 1000 steel underframe box cars with the American Car & Foundry Company. The Toledo Shipbuilding Company, Toledo, Ohio, has taken a contract for a car ferryboat, for which the Carnegie Steel Company will furnish about 2000 tons of plates and shapes. The new demand for plates, especially for the large sizes, is very heavy, and several of the leading mills report that they are turning down nice business on which they cannot make the deliveries wanted. Local plate mills are practically filled up to October 1, and most mills are from three or four up to 10 weeks back in deliveries. We quote ¼-in. and heavier plates at 1.25c., Pittsburgh.

Iron and Steel Bars.—The new demand for both iron and steel bars continues fairly heavy, and actual new orders coming in, together with specifications, are still in excess of the rolling capacity of the mills. A notably heavy demand for hard steel bars for reinforcing purposes is reported and the commitments of the steel bars mills at this time are such that they are guaranteed operations at full capacity for the next two or three months at least. The steel bar companies are very heavy consumers of iron and steel bars at present, and the implement makers are also specifying freely against contracts. There is some prospect of labor troubles with the puddlers on July 1, and this may result in a suspension of work until a scale is arranged. Prices are firm. We quote steel bars at 1.20c. on new orders and common iron bars 1.25c. to 1.30c., f.o.b. Pittsburgh.

Cotton Ties.—While the season in cotton ties opened only recently a good deal of tonnage has been sold and more contracts are expected to be placed in the near future. The price is 72c. per bundle, f.o.b. Pittsburgh, in large-lots.

Tin Plate.—Not much new business is being placed at present, as this is the off season and buying will not be heavy until about October. This, however, is not embarrassing in any way to the tin plate mills, as they are filled up with contracts that will take their entire output over the next two or three months, on which consumers continue to specify very heavily. Only a small amount of new business has been entered at the new price of \$3.50 per base box, but most mills are quoting this price on new orders for third quarter, while a few are taking business for that delivery at \$3.40 per base box for desirable orders. There is every evidence that the output and consumption of tin plate this year will be much the heaviest ever known in the tin plate trade. The market is reported firm. We quote tin plate at \$3.40 to \$3.50 base, for 14 x 20 coke plates, f.o.b. Pittsburgh.

Sheets.—Specifications against contracts continue to pour into the mills at an unprecedented rate and will be especially heavy this month, as some consumers have contracts which expire on June 30, and they will no doubt specify for every pound. All the leading mills are operating to as full capacity as the labor supply and delivery of sheet bars will permit, and the output of sheets at this time is heavier than ever before in the history of the trade. The new demand for sheets, especially roofing material, is quite heavy, and the sheet trade from every point of view is in very satisfactory condition, the only trouble being that the mills are not supplying sheet bars fast enough and it is difficult to get labor. The market is firm, No. 28 black sheets being held at 1.90c. to 1.95c. and galvanized sheets from 2.90c. to 3c., f.o.b. Pittsburgh, the lower prices named being reported as absolute minimum of the market.

Hoops and Bands.—While there is a fair new demand, the mills are running mostly on specifications against contracts which are coming in very freely. Some large consumers of both hoops and bands have recently made contracts covering their requirements for last half of the year, and at reported full prices. We quote steel bands on new orders at 1.25c., with extras as per the steel bar card, and steel hoops at 1.25c. to 1.30c., the lower price being stated to be absolutely minimum of the market.

Bolts and Rivets.—The new demand for bolts and rivets is quite heavy, two local consumers reporting that actual orders entered in May were the heaviest in any one month in their history. Specifications against contracts are coming in very freely, and some of the bolt and rivet makers are now from four to eight weeks back in deliveries. We quote structural rivets at \$1.50 to \$1.55 per 100 lb. base in carload lots and boiler rivets

at \$1.60 to \$1.65 per 100 lb. base in carload lots, f.o.b. Pittsburgh. We quote: Small carriage bolts, cut thread, 20 and 7½ per cent. off; small carriage bolts, rolled threads, 80 and 15 off; large carriage bolts, 75 and 10 off; small machine bolts, rolled threads, 80 and 20 off; small machine nuts, cut threads, 80 and 12½ off; large machine bolts, 75 and 15 off; square hot-pressed nuts, blank or tapped, \$6.30 off, and hexagon nuts, \$7.10 off. These prices are in lots of 300 lb. or over delivered within a 20c. freight radius of maker's works.

Shafting.—The expected advance in the price of shafting has been made, and makers are now quoting cold-rolled shafting at 65 per cent. off in carloads and larger lots and 60 per cent. in less than carload lots, delivered in base territory. Only a small amount of new business has been taken at the higher prices, as most consumers are covered ahead for some time at lower figures. Specifications against contracts are coming in more freely than for some time.

Spelter.—The market has been firm and we quote prime grades of Western spelter at 6.80c. East St. Louis, or 6.92½c. Pittsburgh. New demand is said to be heavier than for a long time.

Railroad Spikes.—The large railroads have been specifying very freely against contracts, and the spike makers have more actual business on their books at present than for a long time, and are operating at practically full capacity. The market is strong. We quote base sizes of railroad spikes at \$1.45 per 100 lb., f.o.b. Pittsburgh.

Wire Products.—New demand for wire and wire nails is quiet, but several local mills report that specifications are coming in at a fairly satisfactory rate. It is evident, however, that the bulk of the business is over until fall trade starts. Prices on wire and wire nails are only fairly strong, it being intimated that they have been slightly shaded by one or two mills on some recent contracts. We quote wire nails at \$1.60; cut nails, \$1.50; galvanized barb wire, \$1.90; painted, \$1.60; annealed fence wire, \$1.40, and galvanized fence wire, \$1.70, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Merchant Pipe.—All the leading pipe mills are filled up with work for several months ahead, and are getting back on deliveries, while the new demand continues very heavy. Spang, Chalfant & Co., Inc., of this city have taken 40 miles of 3½ in. and 10 miles of 4 in. for a special line pipe. A Wheeling mill and a Youngstown mill have issued a higher card on line pipe, and a local mill will issue a new card on June 15 carrying a general advance on all sizes of about one point, or \$2 a ton. The whole pipe market is very firm. It is said that the new discounts on steel pipe up to 6 in., adopted June 1, are being firmly held.

Boiler Tubes.—The new demand is light and only for small lots, as most consumers covered ahead some time ago, prior to the advance of \$3 a ton, and are specifying very heavily against these contracts. The new demand for merchant tubes is reported better than for some time.

Coke.—There has been a decided easing in prices of prompt furnace coke, and also for last half delivery. It is evident that several makers have become convinced that they cannot obtain \$2.50 on furnace coke for last half. One local coke producer has sold 15,000 tons per month for last half of the year at \$2.25 at oven. Several consumers in the Valleys and also in the East have shut off shipments temporarily, and the available supply of furnace coke for prompt delivery is therefore larger. We note a sale of 5000 tons of standard furnace coke per month for last half of the year at \$2.15 at oven. One large Eastern consumer has decided not to contract for its coke for last half but will buy from month to month, believing it can do better. A large Eastern dealer has been offering furnace coke freely at \$2.10 and this has disturbed the market to some extent. This dealer is reported to have sold a very heavy tonnage of coke short and expects to cover later on. We quote standard makes of prompt furnace coke at \$1.90 to \$2 and for last half delivery at \$2.25 to \$2.40, per net ton at oven. Strictly high grade 72-hour foundry coke is held for last half delivery at prices ranging from \$2.40 up to \$2.75. One leading local coke concern has taken some very heavy contracts for foundry coke for last half on the basis of \$2.40 per net ton at oven. The output of coke last week in the Upper and Lower Connellsville regions showed a falling off, amounting to 379,121 net tons, a decrease over the previous week of 5200 tons.

Iron and Steel Scrap.—All signs are pointing to a higher market on scrap, and dealers are disinclined to sell material short for fear they will not be able to

cover. The consumption of scrap is now enormously heavy, and has been for some months, and the available supply is limited. A local steel consumer has bought 2000 tons or more of heavy steel scrap in the past week at \$13.50 delivered. Prices on heavy steel scrap, bundled sheet scrap, borings and turnings and low phosphorus scrap are very strong. The latter material has shown a clean advance of about \$1 a ton within two weeks. We note a sale of 1000 tons of heavy steel scrap at \$13.50; 1200 tons at \$13.40; 500 tons of wrought turnings at \$10.90; 500 tons of borings at \$10; and 600 tons of low phosphorus melting scrap, guaranteed under 0.04 in phosphorus, at \$15.75, all delivered at buyer's mill in the Pittsburgh and nearby districts. We quote as follows, per gross ton:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$13.50
No. 1 foundry cast	12.75 to 13.00
No. 2 foundry cast	11.50 to 11.75
Bundled sheet scrap f.o.b. consumers' mill, Pittsburgh district	11.75 to 12.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.75 to 14.00
No. 1 railroad malleable stock	12.50 to 12.75
Grate bars	9.75 to 10.00
Low phosphorus melting stock	15.75 to 16.00
Iron car axles	22.50 to 22.75
Steel car axles	15.75 to 16.00
Locomotive axles	22.00 to 22.50
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	14.00 to 14.25
*Cast iron borings	10.00 to 10.25
*Machine shop turnings	10.50 to 10.75
†Sheet bar crop ends	14.75 to 15.00
Old iron rails	15.50 to 15.75
No. 1 wrought scrap	13.75 to 14.00
Heavy steel axle turnings	11.00 to 11.25
Stove plate	10.25 to 10.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Chicago

CHICAGO, ILL., June 10, 1912.

In view of the heavy orders that buyers have been sending mills and the sold-up condition of nearly all of the finished steel products the slow advance in prices has been more than unusual, but now many indications point to a shaping of the market toward moderate advances. There is apparently no immediate prospect of a halt in the inflow of specifications, and even in new business a surprising volume of orders are being received. Under present conditions prices are incidental and buyers are concerned only with the problem of obtaining deliveries to meet their needs. Slight advances are noted in steel bars above the ruling price of 1.38c., Chicago, for small lots that the mills are able to accept with a promise of reasonably prompt delivery. For bar iron prices are generally \$1 a ton higher and 1.30c., Chicago, is the ruling quotation. With the exception of a fair inquiry for malleable Bessemer the local pig iron market is quiet. Old material is not so firmly held, although the evidences of weaknesses are not pronounced.

Pig Iron.—The tacit acceptance by consumers of the recent advance in local iron to the basis of \$14.50 has encouraged the feeling that conditions warrant even higher values for Northern iron. Inquiry during the past week has been confined very largely to malleable Bessemer, for which several inquiries in the neighborhood of 1000 tons are noted, together with sales of like amount. In other grades and in Southern iron little interest is being shown. Prices continue firm and we quote, for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices on prompt shipments:

Lake Superior charcoal	\$16.25 to \$16.75
Northern coke foundry, No. 1	15.00
Northern coke foundry, No. 2	14.50
Northern coke foundry, No. 3	14.25
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	16.10 to 16.35
Southern coke, No. 2 foundry and No. 2 soft	15.85 to 15.85
Southern coke, No. 3	15.35 to 15.60
Southern coke, No. 4	14.85 to 15.10
Southern gray forge	14.35 to 14.60
Southern mottled	13.85
Malleable Bessemer	14.50
Standard Bessemer	16.75
Basic	14.50
Jackson County and Kentucky silvery, 6 per cent.	17.40
Jackson County and Kentucky silvery, 8 per cent.	18.40
Jackson County and Kentucky silvery, 10 per cent.	19.40

Rails and Track Supplies.—Rail business for the balance of the year seems certain enough to leave local mills with slackened interest in continued heavy specifications. Track supplies likewise are being taken out in large quantities. We quote standard railroad spikes

at 1.55c. to 1.65c., base; track bolts with square nuts, 1.95c., base, all in carload lots, Chicago; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.20c. to 1.25c.; 16 to 20 lb., 1.25c. to 1.30c.; 12 lb., 1.30c. to 1.35c.; 8 lb., 1.35c. to 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—In Chicago two or three buildings involving large tonnage are about to come up for figures, but during the past week fabricating contracts were scattered and comparatively unimportant. The situation is improved in that better prices are being obtained by fabricators. The more important business of the week included 1900 tons for highway bridges over the Chicago River, awarded to the Strobel Steel Construction Company; 1000 tons of bridge girders for the St. Paul Railway placed with the Wisconsin Bridge & Iron Company. The American Bridge Company will fabricate 214 tons for the United States Smelting Company's sintering plant at Midvale, Utah; 305 tons for bridge girders for the Burlington Railroad, and 477 tons of bridge work for the Missouri, Kansas & Texas Railway Company. The Worden-Allen Company was awarded 206 tons for a public service power station at Waukegan, Ill., and 251 tons for the Madison Terminal Building, Chicago, will be furnished by A. Bolter's Sons, and 184 tons for a heating plant at the University of Minnesota has been awarded to the Minneapolis Steel & Machinery Company. The Morava Construction Company was the low bidder for 1200 tons for the Armory building at the University of Illinois. Other miscellaneous contracts amounting to about 500 tons are reported. Prices are without change and we quote, for Chicago delivery, mill shipment on plain shapes, 1.43c., and from store, 1.70c.

Plates.—The Sandusky River Power Company has ordered 1030 tons for a pipe line at Fremont, Ohio, from the Riter-Conley Mfg. Company. It is understood that the Illinois Central will allot its orders for 2500 cars during the current week. We quote for Chicago delivery, mill shipment, 1.43c. and from store 1.70c.

Bars.—Bar iron mills are supplied with orders making deliveries within two months impossible. Further business is not being sought and when accepted, is generally at prices above 1.25c. Chicago. While it is possible to obtain bar iron at less than 1.30c., the larger number of new orders are being placed on that basis. There is no diminution in the volume of steel bar specifications. We quote as follows: Bar iron, 1.27½c. to 1.30c.; hard steel bars, 1.20c. to 1.25c.; soft steel bars, 1.38c., and from store, soft steel bars, 1.60c., Chicago.

Sheets.—While the condition of the principal sheet mills is similar to that of mills rolling other finished products, there is less uniformity in prices and it is still possible to obtain some concessions from our ruling quotations. We quote, Chicago delivery, as follows: Carload lots, from mill, No. 28 black sheets, 2.08c. to 2.13c.; No. 28 galvanized, 3.13c. to 3.18c.; No. 10 blue annealed, 1.58c. to 1.63c. Prices from store are: No. 10, 1.95c.; No. 12, 2c.; No. 28 black, 2.30c., and No. 28 galvanized, 3.45c.

Rivets and Bolts.—While the prices of bolts and screws are decidedly firmer, it is still true that current quotations for these products are low as compared with bar prices. In volume sales are much improved. The manufacturers' schedule of discounts for carriage bolts has been revised and we quote, effective May 21, as follows: Carriage bolts up to ¾ in. x 6 in., rolled thread, 80 and 15; cut thread, 80 and 7½; larger sizes, 75 and 7½; machine bolts up to ¾ in. x 4 in., rolled thread, 80 and 20; cut thread, 80 and 12½, larger sizes, 75 and 12½; coach screws, 80 and 20; hot pressed nuts, square head, \$6.30 off per cwt.; hexagon, \$7.10 off per cwt. Structural rivets, ¾ in. and larger, 1.68c. base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Wire Products.—A demand for wire products, particularly for nails, is being sustained unusually well for this season of the year. In barb wire and fencing, anticipations well supported are leading to preparations for a heavy fall demand. This is particularly true of manufacturers. We quote as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78 to \$1.83; galvanized, \$2.08; polished staples, \$1.83; galvanized, \$2.13, all Chicago.

Cast Iron Pipe.—Bids will be received this week at Omaha for between 6000 and 7000 tons of pipe. At Herrin, Ill., figures were taken for 1000 tons of pipe, but the award has not yet been formally made. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$27; 6 to 12 in., \$25; 16 in. and up, \$24.50, with \$1 extra for gas pipe.

Old Material.—The local scrap market during the past week has not presented quite so strong a front and while no general weakness is markedly apparent, certain grades show slight concessions, particularly in steel and foundry scrap. This is in part due to recent heavy buying by consumers, who have covered their requirements for a possible 30 days. The continued inflow of material has also contributed to this situation. The Chicago, Milwaukee & St. Paul is offering 2000 tons which includes 500 tons of re-rolling rails, the Michigan Central has a list of 2500 tons on which is an item of 500 tons of car wheels, and the Great Northern advertises 3000 tons. We quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$16.00 to \$16.50
Old steel rails, rerolling	13.25 to 13.75
Old steel rails, less than 3 ft.	12.50 to 13.00
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	14.25 to 14.75
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards, cut apart	12.00 to 12.50
Shoveling steel	12.00 to 12.50
Steel axle turnings	9.50 to 10.00

Per Net Ton.	
Iron angles and splice bars	\$13.75 to \$14.25
Iron arch bars and transoms	15.25 to 15.75
Steel angle bars	11.75 to 12.25
Iron car axles	19.25 to 19.75
Steel car axles	15.75 to 16.25
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Steel knuckles and couplers	11.25 to 11.75
Steel springs	11.75 to 12.25
Locomotive tires, smooth	12.50 to 13.00
Machine shop turnings	7.50 to 8.00
Cast and mixed borings	6.50 to 7.00
No. 1 busheling	10.50 to 10.75
No. 2 busheling	7.75 to 8.00
No. 1 boilers, cut to sheets and rings	8.50 to 9.00
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	10.00 to 10.50
Railroad malleable	11.75 to 12.25
Agricultural malleable	10.50 to 11.00
Pipes and flues	9.25 to 9.75

The Stephenson Charcoal Iron Company, the building of whose charcoal iron furnace at Wells, Mich., near Escanaba, was mentioned in *The Iron Age* of October 12, 1911, will be prepared to ship iron about the middle of July and will be represented in the Chicago territory by Pickands, Brown & Co. Stress is placed upon the high grade of charcoal iron which it is the expectation to make at this furnace.

Philadelphia

PHILADELPHIA, PA., June 11, 1912.

A moderate volume of new business is moving, while the disposition to maintain prices, and in some lines to obtain slight advances, appears more general. Some irregularity is apparent in pig iron quotations, in that the advances asked for foundry grades have not yet become general. Further transactions in basic pig iron are noted, including contracts for delivery in the fourth quarter. The Eastern Pig Iron Association met last week; it reports increased unfilled orders and lower stocks. Stocks are now about as low as they can consistently get and enable shipments covering various grades to be freely made from furnace yards. Virginia producers did not find any marked increase in unfilled orders during May, but there was a comparatively good reduction in the stock on hand. In finished materials the volume of business holds about on an even basis. Specifications continue to come out freely and the current range of prices is more uniformly maintained. Inquiries for quotations on boat plates and shapes continue to come out, usually for smaller size vessels. A contract for a steamer requiring about 1800 tons of plates and shapes has been reported closed by one of the Delaware River yards. The old material market is quiet, although scattered moderate buying of heavy melting steel scrap is reported. Spot furnace coke is weaker, while contract foundry coke has been sold more freely at unchanged prices.

Iron Ore.—Announcement is made of the sale of several cargoes of foreign low phosphorus ore to a consumer in this district. The market for ordinary grades, either foreign or domestic, is comparatively quiet, although occasional small purchases are noted. Importations during the week were confined to Cuban ore, of which 6450 tons was brought in.

Pig Iron.—While several of the recently pending transactions have been closed, the fact that producers of standard brands of foundry iron are making higher quotations has checked buying to some extent, con-

sumers holding back to see how firmly the advance will be held. The leading grades of No. 2 X eastern Pennsylvania foundry are being pretty generally held at \$15.50 to \$15.75, delivered, and while small sales are made at the higher levels, the general market may still be considered on the \$15.25 to \$15.50 basis. Transactions, however, have usually been in small lots for comparatively early delivery. The Pennsylvania Railroad has closed against its recent 8000-ton inquiry for third quarter delivery. Cast iron pipe makers have been buying moderate lots of low grade iron, while one Delaware River foundry has purchased a portion of the tonnage recently inquired for. Low grade iron continues firm at about \$14.75, delivered in this vicinity, and continues scarce. One Eastern malleable iron maker is in the market for 1000 to 2000 tons of coke malleable for third quarter. A moderate volume of business in Virginia foundry iron is noted. One round lot of No. 2 X for Western shipment was sold at \$13, Virginia furnace. The bulk of the sales, however, do not exceed a few hundred ton lots, with deliveries ranging from prompt to third quarter delivery in this and nearby districts. Some little inquiry for rolling mill forge is reported. This grade is quoted nominally at \$14.50 to \$14.75, delivered. Interest is again being shown in basic iron. One Eastern melter is credited with a purchase of upward of 20,000 tons, part third and part fourth quarter shipment, at prices close to \$15.25, delivered, but details are not available. Another melter is offering \$15, delivered, for a moderate block, but for the greater part makers are holding for higher prices, \$15.75 to \$16 representing probably the extreme top of the market, at which point some of the furnaces are holding for fourth quarter delivery. Following recent purchases, the demand for low phosphorus iron has been quiet. Pig iron producers, generally, in this district are now pretty well sold up and report that consumers are taking deliveries freely. While stocks are low, increased production by the merchant furnaces is not considered likely, particularly with the higher fuel cost, unless some further betterment in prices is obtained. Producers, however, find it difficult to establish and maintain a higher basis than quoted for early shipment. The following range of prices is named for standard brands for prompt and near future delivery in buyers' yards in this vicinity:

Eastern Pennsylvania No. 2 X foundry.....	\$15.25 to \$15.50
Eastern Pennsylvania No. 2 plain.....	15.00
Virginia No. 2 X foundry.....	15.80 to 16.00
Virginia No. 2 plain.....	15.55 to 15.75
Gray forge	14.50 to 14.75
Basic	15.25
Standard low phosphorus	19.75 to 20.00

Ferroalloys.—Moderate sales of 80 per cent. ferromanganese for last half and for more extended shipment are reported, \$48.50, Baltimore, being the usual quotation for such delivery. One sale of 600 tons and another of 150 tons are reported on this basis. Scattered inquiries for prompt bring out quotations ranging from \$55 to \$60, Baltimore. Deliveries on contract have been somewhat larger, and the demand for quick shipments to supply delayed deliveries on material contracted for has been less pronounced. Small inquiries for 50 per cent. ferrosilicon are noted, a new basis of prices being announced for this grade of material; in lots of 1 to 90 tons, \$72.50, delivered, is quoted; on 100 to 599 tons \$71.50, and on 600 tons and over \$70.50, delivered.

Billets.—While no further large sales of either rolling or forging billets have been made, mills are receiving a very fair volume of small business, and specifications against contracts have been heavy. Mills are operating at practically full capacity and maintain prices firmly, basic open-hearth rolling billets being quoted at \$23.40 to \$24.40, and ordinary forging billets on a basis of \$28.40, delivered in this vicinity.

Plates.—Mills are operating at a fairly even basis, although new business has, in some instances, shown a slight recession. Specifications, however, continue good, while inquiries are numerous and in cases cover a very fair tonnage. Prices for ordinary plates in moderate lots are firm at 1.40c., delivered, and less is heard of shading on large lots. Miscellaneous business more generally commands 1.45c., delivered. Inquiries covering several thousand tons of plates for shipyard work have come out during the week against proposals for several small boats.

Structural Material.—The market has been somewhat quieter. Bids are in against a number of good propositions, including the new Chesapeake & Ohio pier at Newport News, Va., which is expected to be placed this week. Several other fair-sized projects are

developing in the South. In this vicinity the week's business has been confined principally to smaller building and miscellaneous work. The tone of the market is, however, a shade stronger, and 1.40c. minimum for plain shapes, delivered here, is being pretty generally maintained.

Sheets.—Consumers are making inquiries for contracts to cover third quarter and second half requirements, but mills are in no haste to enter the business, as day to day orders have been sufficient to keep Eastern mills fully occupied. The market is strong, with prices unchanged, Western No. 28 gauge sheets being quoted at 2.05c. to 2.10c., delivered here, although Eastern mills making smooth, loose-rolled sheets easily obtain an advance of from $\frac{1}{4}$ c. to $\frac{1}{2}$ c. per lb.

Bars.—The market has a shade easier appearance, owing principally to the smaller volume of business offered and consequent decrease of unfilled orders on rolling mill books. Ordinary iron bars are available at 1.30c. to 1.35c., delivered here, although some makers still hold out for higher prices. Steel bars are quiet, with prices firm at 1.35c., delivered here.

Coke.—Considerable business in foundry coke for delivery over the second half and for a period of 12 months has been closed in this territory at prices ranging from \$2.40 to \$2.50, at oven. Furnace coke is still irregular, in that prices of prompt coke have been weaker in view of a larger supply, quotations ranging from \$2 to \$2.10 at oven. On contract coke producers hold out for prices ranging from \$2.25 to \$2.50 at oven, but very little business has been done. The following range of prices, per net ton, about represents the market for deliveries in buyers' yards in this vicinity:

Connellsville furnace coke.....	\$4.25 to \$4.75
Connellsville foundry coke	4.65 to 4.85
Mountain furnace coke	3.85 to 4.25
Mountain foundry coke	4.20 to 4.45

Old Material.—There has been a little more movement in some grades, particularly No. 1 heavy melting steel, several Eastern mills taking on moderate lots at \$13.50, delivered. On the recent railroad lists \$14 is reported to have been paid for this grade of material. In the aggregate from 20,000 to 25,000 tons has been purchased during the week. A moderate movement in low phosphorus scrap is also reported. Rolling mill scrap is inclined to be easier, mills offering slightly under recent quotations. Following recent sales of borings and turnings, mills have reduced offering prices, although dealers are paying full prices. The following range about represents the market for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap and crops..	\$13.50 to \$14.00
Old steel rails, rerolling (nominal).....	14.75 to 15.25
Low phosphorus heavy melting steel scrap..	16.25 to 16.75
Old steel axles	17.00 to 17.50
Old iron axles (nominal).....	23.00 to 23.50
Old iron rails (nominal).....	16.50 to 17.00
Old car wheels	14.00 to 14.50
No. 1 railroad wrought.....	15.50 to 16.00
Wrought iron pipe	12.50 to 13.00
No. 1 forge fire	12.00 to 12.50
No. 2 light iron (nominal).....	7.00 to 7.50
Wrought turnings	10.25 to 10.75
Cast borings	9.50 to 10.00
Machinery cast	13.75 to 14.25
Railroad malleable (nominal).....	12.00 to 12.50
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00

Cincinnati

CINCINNATI, OHIO, June 11, 1912.

Pig Iron.—The steady reduction in furnace stocks, especially in the South, is interesting local iron merchants more than anything else. In spite of the fact that business has been very light for the past two or three weeks, this reduction is holding its own, showing that shipments on contracts are going forward at a satisfactory rate. Northern foundry iron is very slow, but a central Ohio melter is expected to close for about 500 tons within the next few days, and local dealers report an almost normal inquiry for carload lots, but they do not expect the foundry trade to come into the market strong until well along in July. Although \$11.50 is asked by a number of furnaces, several leading brands of No. 2 foundry can be purchased for last half delivery at \$11, Birmingham basis. There are now no rumors circulating that this last named figure has been shaded, even for prompt shipment. A Southern melter booked through a local office 500 tons of Southern No. 2 soft at \$11, Birmingham, for prompt shipment. For fourth quarter delivery, an Ohio manufacturer pur-

chased 3000 tons of Northern steel-making iron. Northern foundry iron is weak, in spite of the fact that producers are confronted with high coke prices. It is reported that contracts for the third quarter can be made as low as \$13, Ironton, but \$13.25 is the recognized contract price. Malleable is very quiet and is quoted around \$13.25 for any delivery this year. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry and 1 soft..	\$14.75 to \$15.00
Southern coke, No. 2 foundry and 2 soft..	14.25 to 14.50
Southern coke, No. 3 foundry.....	14.00
Southern coke, No. 4 foundry.....	13.75
Southern gray forge	13.75
Ohio silvery, 8 per cent. silicon.....	17.20 to 17.70
Lake Superior coke No. 1.....	14.70
Lake Superior coke No. 2.....	14.45
Lake Superior coke No. 3.....	14.20
Basic, Northern	14.45
Standard Southern car wheel.....	25.25 to 25.50
Lake Superior charcoal	16.75 to 17.25

Coke.—Many different reports have been circulated regarding a weakening in prices on furnace coke in the different districts. It cannot be ascertained here as to what the pig iron furnace operators in the Hanging Rock district have done for a future supply; several of them have not covered for future requirements, although their contracts expire July 1. We continue our quotations of \$2.25 to \$2.50 per net ton, Connellsville, on 48-hr. coke, and quote Wise County and Pocahontas brands 25c. a ton lower. Foundry grades in all three fields are quoted around \$2.50 to \$2.75 per net ton at oven. Wise County and Pocahontas furnace coke is sold around \$2 to \$2.10 at furnace.

Old Material.—There is practically no change in the market, but it is rumored that two of the leading railroads will have a large quantity of scrap to offer within the near future. The rolling mills in this territory are consuming a full share of scrap iron just now, but the demand from the foundries is not improving. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations the selling prices f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	\$9.00 to \$9.50
Old iron rails	13.00 to 13.50
Relaying rails, 50 lb. and up.....	20.25 to 21.25
Rerolling steel rails	11.25 to 11.75
Melting steel rails	10.25 to 10.75
Heavy melting steel scrap.....	10.25 to 10.75
Old car wheels	12.25 to 13.00

Per Net Ton.	
No. 1 railroad wrought	\$10.75 to \$11.25
Cast borings	6.50 to 7.00
Steel turnings	6.50 to 7.00
No. 1 cast scrap	11.00 to 11.50
Burnt scrap	7.75 to 8.25
Old iron axles	16.25 to 16.75
Locomotive tires (smooth inside).....	12.00 to 12.50
Pipes and flues	7.25 to 7.75
Malleable scrap	8.75 to 9.25
Railroad tank and sheet scrap.....	6.75 to 7.25

Finished Material.—No large inquiries for structural material have come out in the past few days, but it is expected that orders will be let soon for two buildings in Dayton, Ohio, and there are also a number of contemplated structures in Cincinnati that will require a fair tonnage of beams and channels. Structural material is firm at 1.25c., Pittsburgh, and steel bars at 1.20c. A few mill agencies expect an advance in these quotations within the next few days. Specifications on contracts are excellent, and the local warehouse business is also good.

Birmingham

BIRMINGHAM, ALA., June 10, 1912.

Pig Iron.—The market continues strong, with more and more difficulty being experienced by buyers who want iron at present quotations. A leading broker who sounded all the makers last week declares that \$11.25, with 1 per cent. off, was the best offer he could secure, and this was from the company with most iron on hand. A large interest is reported as having sold 1500 tons for June delivery at \$11.50. It has quoted \$11.50 for some time and is now said to have turned down an offer of \$11.50 for fourth quarter. Its yards have been absolutely cleaned up. A leading interest is reported as having absolutely no iron in stock. Consumers are asking for prompt delivery and shipments are being made from furnace to consumer. Stock accumulations no longer figure in price making. Last quarter iron is not quoted under \$11.50. Third quarter analysis iron has been sold at something like \$12.50 in a 1000-ton lot. There has not been a

large aggregate of sales during the week. Operators are not in a hurry to sell for the fourth quarter and consumers are pretty well supplied for the third quarter. The principal buyers are foundries, which are taking small lots. The average price paid during the week has been around \$11.25 for June delivery. Both maker and consumer seem to be looking for higher prices before long. Minimum prices, f.o.b. Birmingham, with 25 to 50c. advance asked by several companies, may still be quoted as follows:

No. 1 foundry and No. 1 soft.....	\$11.50
No. 2 foundry and No. 2 soft.....	11.00
No. 3 foundry	10.50
No. 4 foundry	10.00
Gray forge	9.75
Basic	10.50
Charcoal iron	\$22.00 to 22.50

Cast Iron Pipe.—Prices of pipe have finally responded to the general market tendency and are somewhat higher. Yards are clear of stocks and plants running on full time. Shipments, owing to good weather, are unhampered and heavy. Further price advances are expected by July 1 and will certainly be made if pig iron advances. Quotations f.o.b. cars Birmingham are as follows, per net ton: 4 to 6 in., \$23.50; 8 to 12 in., \$22.50; over 12-in., average \$21.50, with \$1 extra for gas pipe.

Old Material.—Old material is active. Local consumers and those in Chattanooga and Atlanta have been good takers of wrought and steel scrap, while light cast and machinery scrap have also moved well. There is a good demand all round, with prices asked by dealers as follows, per gross ton, f.o.b. Birmingham:

Wrought iron car axles.....	\$16.00 to \$17.00
Old steel ax'les	14.50 to 15.50
Old iron rails	14.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	9.00 to 9.50
No. 1 machinery	8.50 to 9.00
No. 1 steel	9.50 to 10.00
Tram car wheels	10.00 to 10.50
Standard car wheels	11.50 to 12.00
Light cast and stove plate	8.00 to 8.50

Coal and Coke.—Reports from Alabama mine inspectors are that collieries are more active than usual for June. Domestic yards are continuing to lay in stock and there is an active inquiry from the oil and fertilizer plants which are to renew operations in 30 to 60 days. Foundry coke is quiet but firm at \$3.25 to \$3.75 per net ton at oven. Very little outside coke is coming in owing to an advance in price, which gives the Alabama coke the best showing.

St. Louis

ST. LOUIS, Mo., June 10, 1912.

Politics is having no noticeable effect on current business. The situation is regarded as firmer than it has been at any time since the recent advances were posted and there is every confidence that plenty of new business will come out soon after the first of the coming month.

Pig Iron.—The new sales of the week included 1000 tons of malleable Bessemer to a local melter and an inquiry from the same source for the same amount has been temporarily withdrawn. Specifications on contract continue right up to the mark and iron is going forward so rapidly and under such insistence as to show that consumption is close on the heels of deliveries. In the case of one large interest quotations have been withdrawn with instructions to refer all inquiries to the furnace before acting. No. 2 Southern, Birmingham basis, is \$11 for spot and \$11.25 to \$11.50 for third and fourth quarters. In one instance the past week \$12 was quoted on a third quarter inquiry on which the tonnage was not mentioned. Other irons continue unchanged.

Coke.—The movement of coke continues satisfactory, but there are no new contracts to report. Specifications on contracts show no falling off and the urgency for delivery is increasing, indicating that melters have no large stocks on hand. There have been no changes in quotations during the week and no tendency toward softening from those last reported.

Finished Iron and Steel.—Orders in finished material have continued to come in fast, but no large orders are included. Deliveries are growing more and more extended in structural, in plates and in bars, in plates especially. In standard steel rails there have been no orders placed, but about 50,000 tons, divided among

five roads, are under consideration and are fully expected to develop into contracts soon after June 30. In light rails there is nothing to report. Track fastenings are moving very rapidly and deliveries are more extended than before.

Old Material.—The railroad lists, which were reported last week, went at high prices and the bidders included a large number of dealers from out of town who secured a large proportion of the more than 5000 tons offered. The fact that local consumers are still 30 to 40 cents per ton below the outside markets in their offers is responsible for the local dealers buying here and shipping to Chicago and elsewhere. Local yard stocks are light and the dealers are in a very independent position at the present moment. Relaying rails are in good request and firm at the prices given. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$14.00 to \$14.50
Old steel rails, rerolling	12.00 to 12.50
Old steel rails, less than 3 ft.	12.00 to 12.50
Relaying rails, standard section, subject to inspection	22.00 to 22.50
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	12.00 to 12.50
Frogs, switches and guards cut apart	12.00 to 12.50

Per Net Ton.	
Iron fish plates	\$13.00 to \$13.50
Iron car axles	18.00 to 18.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.75 to 12.25
Railway springs	10.50 to 11.00
Locomotive tires, smooth	12.50 to 13.00
No. 1 dealers' forge	8.50 to 9.00
Mixed borings	6.75 to 7.25
No. 1 busheling	9.50 to 10.00
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	11.00 to 11.50
Stove plate and light cast scrap	8.50 to 9.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	8.50 to 9.00
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	8.00 to 8.50
Railroad grate bars	9.00 to 9.50
Machine shop turnings	7.50 to 8.00

Cleveland

CLEVELAND, OHIO, June 11, 1912.

Iron Ore.—Vessel contracts for carrying more than 600,000 tons of ore were placed during the week. The movement is heavy and there are cargoes for about all of the lake boats except a few of the smaller vessels. Shipments are so large that there is a scarcity of cars for moving ore from the mines to the docks. Coal cargoes are not so plentiful as desired and some of the boats engaged in the ore traffic are going up the lake light. We quote prices at Lake Erie dock as follows: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old range non-Bessemer, \$3.05, and Mesaba non-Bessemer, \$2.85.

Pig Iron.—The market is not active. However, in northern Ohio territory a number of sales of foundry grades for the last half delivery were made in lots of 500 tons and under. With the close of the first half of the year at hand many of the small consumers who have been holding off are now covering for their requirements for the remainder of the year. The market is very firm. One local seller has advanced its price for No. 2 foundry 25c. a ton to \$13.50, at furnace, for Cleveland delivery, and has taken some business at the advance. For outside shipments the quotation is unchanged at \$13.25. Some market feelers have come out for prices for the first quarter of the next year, but furnaces are not disposed to quote for that delivery. For prompt shipment and the last half we quote, delivered Cleveland, as follows:

Bessemer	\$15.15
Basic	13.50
Northern No. 2 foundry	\$13.50 to 13.75
Southern No. 2 foundry	15.35
Gray forge	13.00
Jackson silvery, 8 per cent. silicon	17.05 to 17.55

Coke.—The market is quiet and prices are firm, with the exception of furnace coke for prompt shipment, which is softer, owing to an increase in the available supply. Some producers who have closed considerable foundry coke at \$2.50 for the last half have temporarily withdrawn from the market. We quote Connellsville furnace coke at \$2.10 to \$2.15 per net ton, at oven, for spot shipment, and \$2.25 to \$2.50 for contract. Connellsville foundry coke is held at \$2.50 to \$2.75 for spot shipment and last half delivery.

Finished Iron and Steel.—Specifications in the aggregate do not appear to be quite so heavy as during the few previous weeks, but there is more new business

in prospect. Mills are getting a fair volume of new orders for less than carload lots, largely for early delivery. Owing to the congested condition of the mills in the Pittsburgh district eastern mills are taking orders for plates and structural material, shading their prices to get the business. These small lot sales are made by mills in the Philadelphia district, so that with the freight added they amount to about \$2 a ton above regular market prices. Plates in particular are scarce and Pittsburgh district mills able to make prompt shipment are selling small lots in some cases at \$1 a ton premium. Steel bars are very firm. The demand for open hearth steel bars is very heavy, but orders for Bessemer bars are comparatively light. The latter can be had for prompt shipment. The bar iron market is in a very satisfactory condition. Orders are plentiful and local mills have made another advance of \$1 to \$1.30 at mill. Western bar iron mills are now crowded with orders, and as a result considerable Western business is coming to Cleveland mills, which cannot make deliveries within 30 days. Local mills are operating at capacity with difficulty because of a scarcity of puddlers. The demand for hard steel bars for early delivery for reinforcing purposes is very heavy and some of the mills are so well filled up that they are practically out of the market. Hard steel bars are firm at 1.15c. to 1.20c., Pittsburgh. In structural lines there is considerable work in prospect which has not yet reached the point of asking for bids. Sheet specifications are heavy. Quotations are unchanged at 1.90c. to 1.95c. for No. 28 black and 2.90c. to 2.95c. for No. 28 galvanized.

Old Material.—The market continues fairly active. The local demand was not particularly brisk during the week, but considerable material was sold to Valley and Pittsburgh districts. An Alliance consumer bought a round tonnage of heavy steel scrap of special grade at \$14, delivered. Quotations on railroad malleable have been advanced 50c. a ton, owing to higher prices prevailing for this grade in the East. Other prices are unchanged, but the market generally is very firm. Scrap offered by railroads during the week brought good prices, a large portion of it going direct to consumers. Dealers' prices, f.o.b. Cleveland, are as follows:

Per Gross Ton.	
Old steel rails, rerolling	\$12.75 to \$13.00
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	12.50 to 12.75
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	12.75 to 13.00
Light bundled sheet scrap	9.50 to 10.00

Per Net Ton.	
Iron car axles	\$18.50 to \$19.00
Cast borings	7.25 to 7.50
Iron and steel turnings and drillings	7.50 to 7.75
Steel axle turnings	8.50 to 8.75
No. 1 busheling	10.75 to 11.00
No. 1 railroad wrought	12.00 to 12.25
No. 1 cast	11.25 to 11.75
Stove plate	9.00 to 9.50
Bundled tin scrap	11.00 to 11.50

Buffalo

BUFFALO, N. Y., June 11, 1912.

Pig Iron.—The market continues strong in tone, with a fair volume of inquiry and orders. Bookings reported for the week foot up between 18,000 and 20,000 tons of all grades, including export trade to Canada. Heavy shipments are going forward from furnaces and an increasing tonnage for Eastern and seaboard points is being sent via the Erie Canal since its opening the middle of last month. Prices have stiffened and furnacemen are holding very firmly to the advances made. We quote as follows, f.o.b. Buffalo, for current and last half delivery:

No. 1 X foundry	\$14.25 to \$14.50
No. 2 X foundry	14.00 to 14.25
No. 2 plain	14.00
No. 3 foundry	13.75 to 14.00
Gray forge	13.50 to 13.75
Malleable	14.25 to 14.50
Basic	14.25 to 14.50
Charcoal according to brand and analysis	15.75 to 17.50

Coke.—Buying has been quite heavy for the week, a number of good contracts being reported.

Finished Iron and Steel.—Specifications on contracts in finished lines are coming in very freely, as it is the general feeling not only among sellers, but also among buyers, that prices are going to be higher. Some mill agents are of the opinion that an increase may be announced before the end of June, at which time many contracts will expire. This prospect will undoubtedly stimulate new buying during the next two weeks.

There appears to be a growing tendency to place orders further ahead to offset the increasing extension of mill deliveries and insure receipt of material for use by the time it is required. The week has shown a large business in reinforcing bars and in rods for bolt makers, while the advance of \$2 per ton in merchant pipe has brought out a large amount of new business in steel pipe. The Lackawanna Steel Company has advanced the price of sheet steel piling \$1 per ton, effective June 8, and cold-rolled shafting has been advanced \$2, making the minimum for carload lots 65 per cent. discount. Fabricated structural material shows continued good demand. A large total of business is developing right along and prices are firm. Bids are being taken this week for 200 tons of light shapes for public school No. 32 and about 100 tons for a machine shop for the Howard Iron Works, Buffalo, also about 100 tons for a warehouse for Elmer E. Harris & Co., Buffalo. The American Bridge Company was low bidder for the addition to the Porter Block, Niagara Falls, 125 tons, and the same company received contract for 500 tons for the addition to the McCurdy-Norwell Company's department store building at Rochester. The Buffalo Structural Steel Company was awarded contract for steel for the Buffalo Natural Gas Fuel Company's office building, Buffalo, 800 tons, and for the steel for the Sisters of Mercy Hospital surgical annex, Buffalo. Steel for the Hamot Hospital nurses' home, Erie, Pa., about 100 tons, was awarded to the Pittsburgh Bridge & Iron Company, Rochester, Pa. The Lackawanna Bridge Company, Buffalo, received contract for the steel, 750 tons, for the Glens Falls Insurance Company's building, Glens Falls, N. Y., and the Kellogg Iron Works, Buffalo, the contract for steel for the Drake business block at Oneida, N. Y., 200 tons. The National Structural Steel Company, Syracuse, took the contract for steel, about 300 tons, for a theatre building to be erected in that city by A. W. Bender, and the F. L. Hughes Company, Rochester, received the contract for the Burt Olney Canning Company, Albion, N. Y., requiring a considerable tonnage of steel. The Owego Bridge Company was low bidder for the highway bridge over the Allegheny River at Salamanca, 440 tons, and for the five Erie Canal bridges, contract section No. 89, 480 tons.

Old Material.—The market is only moderately active, transactions with local mills and foundries still being limited to small tonnages. Some business with outside districts is being done, and prices are well maintained. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel.....	\$12.75 to \$13.25
Low phosphorus steel.....	15.75 to 16.00
No. 1 railroad wrought.....	14.00 to 14.75
No. 1 railroad and machinery cast scrap....	13.50 to 14.00
Old steel axles.....	16.50 to 17.25
Old iron axles.....	21.00 to 21.50
Old car wheels.....	12.50 to 13.00
Railroad malleable.....	11.50 to 12.25
Boiler plate, sheared.....	13.75 to 14.25
Locomotive grate bars.....	11.00 to 11.25
Wrought pipe.....	9.50 to 10.00
Tank iron.....	10.00 to 10.25
Wrought iron and soft steel turnings.....	8.00 to 8.50
Clean cast borings.....	7.00 to 7.50

The German Iron Market

Trade Continues Buoyant

BERLIN, May 31, 1912.—The tendency of prices is still upward. It is announced that the demand for heavy plates is so urgent that the convention controlling these products has made an average advance of 2 marks per ton for the third quarter of the year, and consumers, it is added, are paying the advance without hesitation. Dealers' organizations are raising prices of beams and other structural shapes in accordance with last week's action of the Steel Works Union, the advance in the Saar region having been 4.50 marks. From Belgium comes the report this week of a further advance on basic and puddling pig iron of 1.50 to 2 francs per ton. A Vienna dispatch of yesterday states that the Austrian Cartell has raised bars and wire rods one crown per metric cwt., and sales were opened for the entire second half of the year. It is added that the Austrian works are fully supplied with orders and that sales are still increasing.

Heavy business in pig iron is reported by the Essen Syndicate. New orders taken to May 18 amounted to 140,000 tons, and specifications in hand have reached 94 per cent. of the allotments, as against 86 per cent. a month ago. At the middle of the month the entire

amount under contract was 3,200,000 tons, or nearly the full aggregate allotments. A sale of 10,000 tons of spiegeleisen to American buyers has just been reported from the Siegerland district. Delivery is to be made in the second half of the year. The Ore Syndicate of that region reports a growing demand for ores.

The demand for cast-iron pipes is so heavy that some of the works are stipulating more than 5 months for delivery, and prices have been raised to correspond to the position of the general market. For the moment new orders are not coming in so rapidly as some time ago, but makers regard this condition as only temporary.

In the Silesian district the mills are working at their utmost capacity, and the home market is absorbing enormous amounts of iron and steel. The home demand for semi-finished material is so strong that makers are keeping down their foreign shipments to some extent. Supplies of all kinds on hand at the mills and with dealers have been heavily reduced within the past few months, and in some cases they have been completely exhausted. The mills are compelled, in taking new orders, to stipulate remote periods for delivering bars, structural shapes, bands, rails and heavy and light plates. They complain of a shortage of pig iron, ingots, billets, slabs and other material.

The various dealers' organizations for beams, which maintain a working agreement among themselves, have been provisionally prolonged to the end of September; but the South-German organization has not cast in its lot with the others again, and it is predicted that it will be dissolved on account of internal difficulties. Efforts will be continued for bringing about a prolongation of all the associations beyond September for a period of years. The Union is moving in the matter.

A community of interest arrangement between Krupps and the Westfälische Eisen und Draht-Industrie for a period of 30 years was made about the beginning of 1911, and was duly reported in this correspondence. According to an Essen dispatch Krupp is now planning a complete amalgamation of the establishment in the middle of 1913.

British Market Stationary

Some Works Oversold—Competition from German Structural Steel

(By Cable)

MIDDLESBROUGH, ENGLAND, June 12, 1912.

All markets are quiet. Midland iron workers have given notice to terminate the wages board, this being the latest disturbing labor factor. The Falkirk molders' strike, which promised one week ago to cause some little reduction in pig iron output, ended yesterday. Stocks of pig iron in Connal's stores are 334,000 tons, against 342,000 tons one week ago.

Semi-finished steel is firm. Belgian 2-in. billets have sold at 110s. delivered Birmingham. New buying is limited. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 54s. 1d. the same as one week previous.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 54s. 6d.

Steel sheet bars (Welsh) delivered at works in Swansea Valley, £5 17s. 6d.

German 2-in. billets, f.o.b. Antwerp, 100s.

German basic steel bars, f.o.b. Antwerp, £5 16s.

Steel bars, export, f.o.b. Clyde, £7 15s.

Steel joists, 15-in. export, f.o.b. Hull or Grimsby, £6 17s. 6d.

Steel ship plates, Scotch, delivered local yard, £7 17s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 5s.

Steel rails, export, f.o.b. works port, £6 7s. 6d. to £6 10s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 6d., October-December.

(By Mail)

Pig Iron Quiet and a Trifle Disappointing

MIDDLESBROUGH, June 1, 1912.

The excellence of general trade is attested by the increasing store withdrawals of pig iron, the total quantity of No. 3 Cleveland now held by Connal & Co. having fallen well below 350,000 tons. But the fact has not

been sufficient to infuse any fresh activity into the speculative market, which has now and again worn a rather stale appearance, new buying being at a standstill. Great difficulty has been found in getting the furnaces back into full work, and even to-day production has not entirely recovered. The tone of the pig iron market generally is one of quiet confidence and most of the big people have stuck to their purchases even though they express a little disappointment at the lack of resiliency in prices lately shown. Probably the rise was too rapid, for when it was put round that 60s. would shortly be touched a lot of people bought a little, while of course the insiders sold. Somewhere around to-day's price is said by makers to be fully justified, and it is reported that the largest makers will have no iron to spare for the open market this year.

Steel Works Oversold

That some of the steel works are oversold is a fair assumption from the efforts made to buy big lines of foreign ingots. A five-figure lot is still under negotiation by an East Coast plant, with one of the independent American works, and it may go through if only transport can be arranged, and the potential buyers are prepared to book a further equal lot. The German Steel Works Union is in a very strong position and absolutely declines to quote for sheet bars, while it has sold small lots of 2-in. billets for July-December shipment at 100s., f.o.b. Antwerp. This week American sheet bars were offered at 97s. 9d., delivered Glasgow, but no definite decision has yet been reached. Welsh consumers of half finished steel are having a bad time getting deliveries, while over £6 a ton has been paid for prompt supplies of bars. The general finished steel trade looks pretty good, and Scotch producers have raised prices by another 5s. for angles and plates, making the fourth similar advance since October last.

Extras on German Structural Steel

In consideration of the recently revised prices of steel joists for the British market, declared by the German Steel Works Union, the following represents the Union's standard list of extras for Great Britain. The base price given applies only to all places south of a line drawn from Chester through Nottingham to Kings Lynn, north of which and in Scotland a rebate of 3s. a ton is allowed in order to meet the competition of British steel works.

Quality: Basic Bessemer steel, usual good merchantable quality.
Joists—In lengths from 3 to 40 ft.
All sections from 3½ in. to 12 in. £5 11s basis.
All sections over 12 in. to 16 in. 3s extra
All sections over 16 in. to 20 in. 6s extra
All sections over 20 in. to 21½ in. 15s extra
All sections over 21½ in. to 24 in. 20s extra
Channels—In lengths from 3 to 40 ft.
All sections from 3½ in. to 7½ in. 4s extra
All sections over 7½ in. to 11½ in. 6s extra
All sections over 11½ in. to 15 in. 15s extra
Zores Beams—In lengths from 3 to 33 ft.
All sections 12s extra
Allowances, in lengths 1½ in. plus; for stock orders 4 in. plus, or 2 in. plus and minus, as stipulated; in weight, 4 per cent. plus and minus.
Prices are per ton of 1015 kilos.
Terms, net.
Payment, subject to arrangement.

EXTRAS

Basic steel with 27/31 tons tensile strain and 20 per cent. elongation 1s 3d per ton
Basic steel with 28/32 tons tensile strain and 20 per cent. elongation 3s per ton
Siemens-Martin steel with 28/32 tons tensile strain and 20 per cent. elongation 5s per ton
Lengths of joists and channels over 40 ft., 1s per ton per foot or part of a foot.
Lengths of joists, channels and Zores under 3 ft. to 500 mm, 4s per ton or part of a ton.
Lengths of joists, channels and Zores under 500 mm according to arrangement.
Lengths of Zores beams over 33 ft., 1s per ton per foot or part of a foot.
Cutting within ¾ in. plus and minus. 2s 6d per ton
Fraising to dead lengths within 3 mm plus and minus. 5s per ton
Painting one coat of red oxide or linseed oil or tar. 2s 6d per ton
Painting one coat of red minium or gray minium. 5s per ton
Holes, ordinary, round, punched in web. 1d each
Holes, ordinary, round, punched in flange. 2d each
Holes, ordinary, oval in web. 2d each
Holes, ordinary, oval in flange. 3d each
Holes, ordinary, drilled, 1d extra in each case.
The minimum charge for bolting would in any case be 2s per ton.
N.B.—Differdingen rolled steel beams with broad flanges, "Grey's system," are not included in this list.

The Cleveland Welding & Mfg. Company, now located at 8205 Franklin avenue, Cleveland, Ohio, has placed a contract for a new plant at 11510 Western avenue. The building will be 75 x 400 ft., one story, and of reinforced concrete construction. Its erection will give the company about three times its present capacity. E. R. Heinsohn is the president and manager.

New York

NEW YORK, June 12, 1912.

Pig Iron.—An important New Jersey interest which manufactures light castings for its own use has been in the market the past week and is reported to have bought from 9000 to 10,000 tons for delivery in the third and fourth quarters, the business being distributed among Eastern Pennsylvania and Buffalo district furnaces. Deliveries from Buffalo will be made in the season of navigation; from Eastern Pennsylvania furnaces they will extend through the second half. Another New Jersey company, a manufacturer of gray iron fittings, has bought about 1800 tons, chiefly No. 2 iron. The Pennsylvania Railroad is understood to have closed in the last few days for several thousand tons of iron, chiefly Northern coke brands. The purchase included also some Northern and Southern charcoal irons. The smaller foundry buyers have not been in the market to any extent in the past week. While a quiet market is looked for through the early summer, there are no indications of easier prices; in fact, the tendency is rather towards firmness. This is true of both Eastern Pennsylvania and Buffalo furnaces. It is understood that a round lot of basic iron has been sold in Eastern Pennsylvania for the fourth quarter at \$15.25 delivered. The last preceding purchases of basic were at about \$15.15 delivered. Buffalo iron for Eastern shipment is now held at \$14 at furnace by some sellers and \$13.75 is minimum. The freight by canal to New York harbor is \$1.35 and the charge for loading on boats at Buffalo, 15 cents. We quote as follows for Northern iron at tidewater: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15.25 to \$15.50; No. 2 plain, \$14.75 to \$15. Southern iron is quoted at \$15.50 to \$15.75 for No. 1 foundry and \$15.25 to \$15.50 for No. 2 foundry.

Finished Iron and Steel.—Confidence regarding the outlook for the summer prevails. The general view is that the volume of business will continue somewhat above the normal. Mills' representatives and fabricators are generally busy, the adverse reports of slackening here and there coming from general contractors. Prices are stiffer except in bar iron, where recent carload shipments have been closed at less than 1.17c. at Eastern mill for refined iron. Cold-rolled shafting has advanced \$2 a ton, the discount for carload lots now being 65 per cent. and for less than carload lots 60 per cent., the base price being 5c. per lb. There is more evidence that fears are developing over threatened extended deliveries and a considerable amount of new business is for quick delivery, resulting in some mills being unable to take the orders and in others getting the business at an advance. Collections are reported good, and as regards structural developments in this territory the condition still holds that financial interests have reduced the margin of speculation steel-building operations. Track accessories seem still to be in high demand and the activity in track laying is indicated by the fact that the supply of relaying rails is insufficient to meet requirements. Steel bars seem particularly strong, a condition of course growing out of the fact that agricultural machinery makers are working under contracts extending to the middle of the next year, that manufacturers have contracts for the remainder of the present year and that jobbers are working under contracts expiring in October. In the structural field considerable interest lies in the Adams Express building, which will, according to latest estimates, require 11,000 tons for its 33 stories, and the 6000 or 7000 tons required for the Chesapeake & Ohio piers at Newport News. An apartment house requiring over 600 tons is to be built at 148th street and Riverside Drive, New York. The Boston & Albany is to purchase bridge material to the extent of 600 tons and the New York Central is to erect two small buildings at its Grand Central terminal, involving 300 tons. Among recent awards are the following: Bridge for the Lackawanna, Binghamton, 150 tons, and for the same railroad at Elmwood avenue, Buffalo, 150 tons, both to the American Bridge Company; the fabrication of the 6000 tons catenary trolley construction, New Haven system, to the McClintic-Marshall Construction Company, which has also taken 300 tons for transmission towers in North Carolina, and 400 tons for a power house, Lowellville, Ohio, for the Republic Railway & Light Company; loft, 16 West Forty-sixth street, 400 tons, and a loft, 115 West Thirtieth street, 1100 tons, both to Milliken Brothers; Victoria loft, 600 tons, to the Passaic Steel Company; building at 3 West Thirty-fifth street, 800 tons, to the Hinkle Iron Company; two bridges for the Boston &

Maine, 300 tons, to the Pennsylvania Steel Company; Altamaha River bridge, Atlantic Coast Line, 300 tons, to the Fort Pitt Bridge Company. It is understood that the Building for Journalism, Columbia University, 1000 tons, general contract awarded to George A. Fuller Company, has been given to Post & McCord, and a 100-ton bridge, requiring early delivery, has been closed for the Raleigh, Charlotte & Southern Railroad. Quotations are: Steel bars, 1.36c. to 1.41c.; plain structural material and plates, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.35c., all New York. Plain material from store, 1.75c. to 1.85c.

Cast Iron Pipe.—Another pipe-laying contract will be placed to-day by the city of New York, involving the purchase of 850 tons, principally 12 and 6 in. Sunbury, Pa., will open bids June 15 on 540 tons. Wolcott, N. Y., will award a pipe-laying contract June 19, requiring the purchase of 600 tons. Private buying is running at about the same rate as for the past few weeks. Carload lots of 6 in. can be obtained from some manufacturers at about \$21 tidewater, per net ton, while others maintain quotations at \$22 to \$23.

Old Material.—Transactions in steel scrap have been few but the market appears to resist efforts to depress prices. A steel company outside of Pennsylvania is reported to have purchased a considerable quantity of steel scrap on which it is alleged that a price equivalent to \$14 eastern Pennsylvania was paid. While one or two eastern Pennsylvania steel mills will pay \$13.50 delivered for strictly No. 1 steel scrap, others are well supplied and are requesting dealers to withhold shipments on contracts, while still others are only open to the purchase of bargain lots. The demand for rolling mill stock has been exceedingly light. Foundries are only purchasing small lots of cast scrap. Dealers' quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting.....	\$11.00 to \$11.25
Heavy melting steel scrap.....	11.00 to 11.25
Relaying rails.....	20.50 to 21.00
Rerolling rails (nominal).....	12.50 to 13.00
Iron car axles.....	20.50 to 21.00
Old steel car axles.....	15.50 to 16.00
No. 1 railroad wrought.....	13.25 to 13.75
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.75 to 11.25
Light iron.....	5.00 to 5.25
Cast borings.....	7.00 to 7.25
Wrought turnings.....	8.25 to 8.50
Wrought pipe.....	10.00 to 10.50
Old car wheels.....	13.50 to 14.00
No. 1 heavy cast, broken up.....	11.75 to 12.25
Stove plate.....	9.00 to 9.50
Locomotive grate bars.....	8.75 to 9.25
Malleable cast.....	10.00 to 10.50

Ferroalloys.—In a market that is a little easier, 80 per cent. ferromanganese continues at \$48.50, Baltimore, forward delivery, and at \$50 and upward for prompt shipment. Sales are reported at \$50 for early delivery. The market for 50 per cent. ferrosilicon is quiet but firm at \$70 Pittsburgh, for future delivery and can be had at that price although some interests are holding out for \$72.50 for carload lots.

Metal Market

NEW YORK, June 12, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

Copper, New York.		Lead		Spelter	
June.	Lake.	Electro-lytic.	Tin, New York.	New York.	St. Louis.
6.....	17.25	17.12½	46.50	4.20	4.12½
7.....	17.37½	17.25	47.50	4.20	4.12½
8.....	17.37½	17.25	47.50	4.20	4.12½
10.....	17.50	17.37½	47.75	4.20	4.15
11.....	17.50	17.37½	47.50	4.20	4.15
12.....	17.50	17.37½	47.37½	4.50	4.37½

Copper continues strong with only a little business and prompt shipment metal is scarce. Tin is quieter with prices holding up. Lead was advanced 30 points to-day by the largest interest. Spelter prices are practically unchanged. Antimony is firm, with Hallett's 2½ points higher.

New York

Copper.—The situation in copper continues strong and every indication is for a prolongation of present conditions and possibly further strengthening of the market. Only a little business is reported to have taken place at the high prices now prevailing, and the buying that was done was mostly for August and September delivery of electrolytic at 17.50c., 30 days' delivery. The most striking feature of the market is that the big producing companies are sold out for early de-

livery. A buyer wanting prompt copper must go to second hands who are holding the metal at above the market price. Lake copper, likewise, is not plentiful for June or July delivery. The strike troubles which hampered the refineries at Baltimore and Laurel Hill, L. I., have abated in those places and the annoyance has been transferred to the works of the American Smelting & Refining Company and the Standard Underground Cable Company at Perth Amboy, N. J. These troubles make the copper situation more acute. Lake copper is quoted to-day at 17.50c.; cash New York, and electrolytic at 17.37½c., cash New York. The London price for spot copper to-day is £77 18s. 9d. and for futures £78 10s. The exports of copper this month total 8895 tons.

Pig Tin.—The activity which has prevailed for several weeks subsided somewhat in the last three days and no large business was done, although in the latter part of last week there were fair sales for future delivery. The shortage of June and spot tin is becoming more acute and the situation is given an unexpected serious aspect because of the extension of the English dock laborers' strike, which was thought to be on the mend but changed for the worse. As previously predicted, a continuance of these conditions will mean a decided tightening of the market. The price of tin in New York to-day is 47.37½c., against 45.75c. a week ago. The price of spot tin in London to-day is £205 10s. and of futures £195 10s. The arrivals of tin this month have been 565 tons and there is afloat 1355 tons.

Tin Plates.—The New York market in tin plates is unchanged at \$3.64 for 100 lb. coke plates, with some dealers asking slightly higher prices.

Lead.—The expected advance in the price of lead as fixed by the American Smelting & Refining Company came to-day and proved to be a surprise in that it raised the price 30 points, or from 4.20c. to 4.50c., New York. Such a large advance had not been expected, although as heretofore said, there has been a bullish sentiment in lead for some weeks. The most plausible explanation of the advance is the realization that consumers must soon come into the market strong. They have been keeping out because of their having purchased heavily when lead was around 4c., but it is figured that these supplies must be about exhausted and that a sturdy demand must soon develop. The St. Louis price to-day is quoted at 4.37½c.

Spelter.—The spelter market has been rather quiet in the last week but prices have been steady at about 6.90c., New York, and 6.75c., St. Louis, for early delivery. The sustained price of spelter which might be expected under ordinary circumstances to fall off at this season of the year is credited to the high prices of ore in the West.

Antimony.—Hallett's antimony is 2½ points higher at 7.87½c., Cookson's is unchanged at 8c. and Hungarian and Chinese grades at 7.25c.

Secretary C. Mayer, of the New York Metal Exchange, has prepared the following comparison of figures showing the great increase in sales on the floor of the Exchange in the first five months of 1912, as compared with the first five months of last year:

	1912.	1911.
Tin.....	3,760 tons	355 tons
Copper.....	1,195 tons	75 tons
Lead.....	750,000 lbs.	none
Spelter.....	6,100,000 lbs.	300,000 lbs.

The greater sales on the floor of the Exchange, it is conceded, are exerting an increasing influence on "outside" prices. Sales of tin have reached such proportions as to exceed on some days the quantity dealt in on the London Metal Exchange.

Old Metals.—The market is strong. Dealers' selling quotations are as follows:

	Cents per lb.
Copper, heavy and crucible.....	16.25 to 16.50
Copper, heavy and wire.....	16.00 to 16.25
Copper, light and bottoms.....	14.50 to 14.75
Brass, heavy.....	9.75 to 10.00
Brass, light.....	8.25 to 8.50
Heavy machine composition.....	13.25 to 13.50
Clean brass turnings.....	9.75 to 10.00
Composition turnings.....	12.00 to 12.50
Lead, heavy.....	4.00
Lead, tea.....	3.75
Zinc, scrap.....	5.50

Chicago

JUNE 11.—Copper prices continue to advance and market activity is centered very largely upon this metal. The scarcity of tin, because of the labor situation abroad, is responsible for higher quotations and some concern among users. Spelter quotations cover a wide range, maximum prices still obtaining on small lots not-

withstanding fairly liberal concessions for tonnage orders. Lack of interest by buyers and liberal supplies of old metals have contributed to a sluggishness in prices for scrap. We quote as follows: Casting copper, 17.37½c.; Lake, 17.62½c. to 17.75c., in carloads for prompt shipment; small lots, ¼c. to ¾c. higher; pig tin, carloads, 48.50c.; small lots, 50.50c.; lead, desilverized, 4.15c. to 4.20c., for 50-ton lots; corroding, 4.40c. to 4.45c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.95c. to 7.05c. Cookson's antimony, 8.50c., and other grades, 8c., in small lots; sheet zinc is \$8.65 f.o.b. La Salle or Peru, Ill., less 8 per cent. discount, in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14.75c.; copper bottoms, 12.25c.; copper clips, 13.75c.; red brass, 12c.; yellow brass, 9.75c.; lead pipe, 3.90c.; zinc, 4.75c.; pewter, No. 1, 28.50c.; tinfoil, 32c.; block tin pipe, 42c.

St. Louis

JUNE 10.—The metal market has been firming up, and lead is quotable here to-day at 4.15c. to 4.17½c., while spelter is 6.85c. for spot, ranging down to 6.75c. for deferred deliveries. Tin is higher in consonance with other markets at 48.10c. to 48.35c. Lake copper is 17.85c. to 18.10c. and electrolytic 17.85c. to 17.95c. Cookson's antimony is unchanged at 8.35c. In the Joplin ore market the past week the record prices that have prevailed for zinc ores the past three months prevailed, the top offerings having reached \$61.50 per ton on an assay basis of \$59 for 60 per cent. The basis ranged downward from this figure as far as \$54 for less desirable lots. Calamine brought \$28 to \$30 on an assay basis of 40 per cent., with the top price as high as \$35. Lead ore was unchanged at \$53 to \$55. On miscellaneous scrap we quote: Light brass, 5c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 10c.; pewter, 21c.; tinfoil, 31c.; lead, 3.50c.; zinc, 3.50c.; tea lead, 3c.

Boston

BOSTON, MASS., June 11, 1912.

Old Material.—While nominal quotations are no lower, prices are not so firm, few buyers being willing to enter the market until the lists have been reduced. The exception is steel scrap, the market for which is firm. Dealers look for prices to go down a little on rolling mill stock. The quotations given below are of prices offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel	\$10.25 to \$10.75
Low phosphorus steel	11.45 to 11.95
Old steel axles	14.00 to 14.50
Old iron ax'es	17.00 to 18.00
Mixed shafting	13.00 to 13.50
No. 1 wrought and soft steel.....	10.00 to 10.50
Skeleton (bundled)	8.25 to 8.75
Wrought iron pipe	9.25 to 9.75
Cotton ties	7.75 to 8.25
No. 2 light	4.50 to 5.00
Wrought turnings	7.25 to 7.75
Cast borings	6.25 to 6.75
Machinery, cast	12.50 to 13.00
Malleable	8.75 to 9.25
Grate bars	6.00 to 6.50
Stove plate	8.00 to 8.50
Cast iron car wheels	11.75 to 12.00

In the United States District Court at Pittsburgh last week a decree was filed in the suit of the United States Government against the Aluminum Company of America, in which an amicable adjustment was secured which is satisfactory to the defendant. The company is ordered to pay the costs of entering the suit and is perpetually restrained from practices antagonistic to the Sherman anti-trust act.

The monthly meeting of the Chicago Foundrymen's Club, held on the evening of June 8, gave opportunity for a continued discussion as to "Suggestions and Appliances for the Prevention of Accidents in the Foundry." This subject was the topic of the May meeting and brought out so much of interest as to lead to further consideration.

The Acme Steel Goods Company, Chicago, reports that since the founding of the company in 1880, each year has brought an enlargement of the business with monthly increases culminating in a record month of sales in May.

Iron and Industrial Stocks

NEW YORK, June 12, 1912.

The market on securities was fairly firm for the greater part of the week, but from Saturday to Tuesday a recession in values occurred which eventuated in a sharp decline on Tuesday. The decline is attributed to the "money trust" inquiry now in progress by a Congressional committee. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref.....	2½	Pressed Steel, com.,	34¼-35¼
Bald. Loco., com....	51¼-54¼	Pressed Steel, pref.	101-101½
Bald. Loco., pref....	107¼-108	Railway Spg., com.,	34¼-35¼
Beth. Steel, com....	36¾-38¼	Railway Spg., pref....	102
Beth. Steel, pref. •	70½-72	Republic, com.....	23¼-25
Can, com.....	33-38	Republic, pref.....	78¼-80
Can, pref.....	116¼-119¼	Sloss, com.....	50¼-52¼
Car & Fdry., com....	58¼-60¼	Pipe, com.....	20¾-21¼
Car & Fdry., pref....	118¼-120¼	Pipe, pref.....	57-58¼
Steel Foundries	35-36¼	U. S. Steel, com....	68¼-71
Colorado Fuel	28¾-32¼	U. S. Steel, pref....	110¼-111¼
General Electric....	168¼-170¼	Westinghouse Elec..	72-74
Gr. N. Ore Cert....	40¾-42¾	Va. I. C. & Coke....	58-58¼
Int. Harv., com....	118¼-122¼	Am. Ship, com.....	54-55
Int. Harv., pref....	120-121	Cambria Steel	43-43¼
Int. Pump, com....	25-28	Lake Sup. Corp....	30¾-30¾
Int. Pump, pref....	79¾-80	Warwick	10¾-10¾
Lackawanna Steel....	35-35¼	Crucible Steel, com.	12¼-13
Locomotive, com....	41¼-42¼	Crucible Steel, pref.	85¼-87¼
Nat. En. & St., com....	16¼	Harb. Wk. Ref., pref....	100
Pittsburgh St., pref.	103¼-103¾		

Dividends Declared

The Westinghouse Air Brake Company, regular quarterly, 2½ per cent.; special, 1½ per cent. and extra 1 per cent.

The Union Switch & Signal Company, regular quarterly, 3 per cent. on the common and preferred stocks.

The Baldwin Locomotive Works, regular semi-annual, 3½ per cent. on the preferred stock, and a dividend of 1 per cent. on the common stock, payable July 1.

Training School for Cleveland Cliffs Mine Employees

A training school for miners to educate the men in its employ and fit them to hold better positions has just been established in the Marquette range in Michigan by the Cleveland-Cliffs Iron Company, Cleveland, Ohio. The territory has been divided into two districts and two schools will be maintained, one at Ishpeming, Mich., and the other at Gwinn Club House on the Swanzey range. The school at Ishpeming will also be attended by employees of the company at Negaunee and North Lake, each three miles distant but reached by trolley cars. Evening sessions will be held at each school two evenings a week. Attendance is to be voluntary and employees of the company from shift foremen down will be eligible. Attendance, for the present at least, will be limited to 150 and that number has already applied for enrollment, although the work has hardly yet been gotten under way.

The school will be in charge of James W. Swent, a graduate of the Michigan School of Mines. He will be assisted by mining superintendents, mining engineers and others qualified for the work. The instruction will be largely in the form of talks. These will be printed in several languages so that the employees can read them over at their homes, and especially for the benefit of those who understand little or no English. Among the principal subjects that will be taught are simple mechanical engineering, mechanical terms, rudiments of geology, including water seepage, flowage, etc., arithmetic, general instruction regarding the size, capacities and repairs of pumps, the repair of drilling machines and other equipment and carpentry. Special attention will be given to mine timbering, various methods of mining, safety rules and devices and to sampling ore.

The classes will be arranged so that some employees will be given instruction in some of the subjects and others will be taught others. The training of the men to know how to repair machinery is expected to be very helpful and to result in much saving of time. While miners now make some minor repairs, they will be taught to do some more difficult repair work, for which machines are now taken from the mines to the shops. A course of instruction in the methods of handling men may also be added. The company may decide later to extend its education into the Gogebic range, where its properties are considerably smaller than those on the Marquette range.

Personal

Chairman E. H. Gary, of the United States Steel Corporation, was in Chicago last week. Of the steel trade he said: "The satisfactory conditions that have prevailed in the steel industry for the last few months continue in evidence. The volume of business is large, but prices remain comparatively low. So far as I know, there is no contemplated action at the present time looking toward an advance in the price of finished products, but I do know there is a shortage of iron."

H. M. Estabrook was elected president of the Barney & Smith Car Company, Dayton, Ohio, at the annual meeting held on June 4, succeeding A. M. Kittredge, who resigned the presidency in April. A. J. Stevens was elected vice-president and general manager to succeed Mr. Estabrook; J. F. Kiefaber second vice-president; E. A. Oblinger, secretary and assistant treasurer, and E. H. Sines, assistant secretary. Mr. Estabrook has been connected with the company since 1885 when he entered its employ as clerk. He has been in turn assistant superintendent, second vice-president and vice-president and general manager.

Ralph B. Curry, formerly superintendent of departments Nos. 2 and 3 of the Allegheny Steel Company, Brackenridge, Pa., has resigned. C. M. Orcutt, who has been superintendent of department No. 1, has been appointed to succeed Mr. Curry, and John Bushner has been appointed superintendent of department No. 1.

President James A. Farrell spent two days in the past week at the Chicago district plants of the United States Steel Corporation.

Coincident with the appointment of W. B. Franklin as general sales manager of the United States Cast Iron Pipe & Foundry Company, with headquarters at Philadelphia, A. J. Goodhue will resume his place as Western sales manager at Chicago. Mr. Goodhue has recovered from the severe illness that resulted in his absence from the Chicago office of the company for many months, during which time Mr. Franklin was in charge.

J. D. Cox, president of the Cleveland Twist Drill Company, Cleveland, Ohio, sailed for Europe on the Mauretania Tuesday.

Louis M. Henoch has become interested as an active member in the corporation of A. M. Castle & Co., 217 to 221 North Jefferson street, Chicago. It is the intention of the company to increase its warehouse facilities immediately and to add to its effectiveness in every way.

Wallace H. Rowe, president Pittsburgh Steel Company, will spend the next few months at Cobourg, Ontario, Canada, where he has had a summer home for a number of years.

Frank H. Jones, who for 10 years has been general superintendent for the Warner Gear Company, Muncie, Ind., has severed his connection with that company to become interested in and associated with the Muncie Gear Works as general superintendent and mechanical engineer. He will add to the company's present production a full line of sliding gear transmissions, control levers and steering devices especially adapted for both pleasure and commercial cars.

Harry P. Whigham, general manager of the London office of the United States Steel Products Company, is spending a few weeks in this country.

J. W. Keffer, formerly manager of the Shelby Iron Company, Shelby, Ala., has resigned to take charge of coal properties recently purchased by him at Seabee, Ky. He is succeeded by L. W. Searles, of Birmingham, Ala., who has been consulting engineer for the Shelby Iron Company for the past year and a half.

Henry Harnischfeger, president Pawling & Harnischfeger Company, crane manufacturer, Milwaukee, Wis., sails from New York June 16 for Europe to be gone two months.

P. H. Gaspard, secretary and treasurer of the Fechtmeier Steel & Iron Company, Allentown, Pa., has disposed of his interest to M. L. Fechtmeier, President.

Charles A. Moore, president Manning, Maxwell & Moore, Inc., 85-89 Liberty street, New York, recently returned from Europe in good health after an absence of nearly two years and is resuming his attention to business.

R. H. Wolff, prominently identified with the introduction of the Heroult electric furnace in this country, will sail for Europe June 15.

Charles Endlich, who has been secretary and treasurer of the Dodge Mfg. Company, Mishawaka, Ind., since its organization, sailed May 28 for a trip to Europe to extend over a period of about three months. This is the second vacation he has had in some 30 years. He will go to Germany for the purpose of spending four or five weeks at the baths, and will then do some traveling in other Continental countries, depending largely upon the state of his health.

Leroy Kramer has been appointed assistant to John S. Runnells, president of the Pullman Company. He was formerly assistant to the second vice-president of the Chicago, Rock Island & Pacific Railway, and succeeds Charles S. Sweet, deceased.

H. Otshima, Osaka, Japan, spent several days in St. Louis last week inspecting electric plants and electric lamp manufactories. He is the head of a large electrical lamp company in Japan and is also a leading electrical engineer.

W. H. Shafer, general superintendent Cincinnati Bickford Tool Company, Oakley-Cincinnati, Ohio, has resigned to accept the position of vice-president and general manager of the Rivett Lathe Mfg. Company, Boston, Mass.

J. C. Deming, who has been connected with the plant of the Waterbury-Farrel Foundry & Machine Company at Waterbury, Conn., has been transferred to Cleveland, Ohio, where he is now connected with the Western sales office of that company.

Wesley Donald, formerly assistant superintendent of labor and transportation at the Ohio works of the Carnegie Steel Company at Youngstown, Ohio, has been made superintendent of that department at the new open-hearth plant now being built by the Brier Hill Steel Company at Youngstown.

Obituary

SAMUEL P. LEWIS, superintendent in charge of the railmaking, structural steel and sheet steel piling mills of the Lackawanna Steel Company, Buffalo, died at his home in that city June 10, aged 56 years. He had been engaged in making iron and steel all his adult life and was regarded as one of the best authorities on railmaking in this country. He was born at Abadare, Wales. His father was one of the first ironmakers to come to America from Wales, and the son followed his calling and was employed with the Illinois Steel Company or its predecessors for 30 years, advancing through the different mill departments until 1905, when he accepted a position with the Lackawanna Steel Company.

DEXTER B. CHAMBERS, secretary of the Stewart Iron Company, Ltd., Cleveland, Ohio, died June 10, aged 83 years. He had been in poor health for some time. He was born in New York State, and when a young man engaged in the lumber business in Cleveland. Later he became associated with the steel industry in Youngstown, Ohio, where for a number of years he looked after the affairs of Brown, Bonnell & Co. as a representative of Fayette Brown of Cleveland, the receiver. He had been associated with the Stewart Iron Company for 23 years. He was a veteran of the Civil War. He leaves one son, Henry Chambers.

GEORGE H. SMITH, president and general manager of the George H. Smith Steel Castings Company, Milwaukee, Wis., died May 4 after a short illness. Although but 49 years old at the time of his death, he had been at the head of the company bearing his name for the past 13 years, succeeding his father, C. J. Smith, who founded the firm of C. J. Smith & Son, who, prior to the development of the production of steel castings, were engaged in the manufacture of bicycle parts. A. O. Smith, president of the A. O. Smith Company, Milwaukee, is one of three surviving brothers.

GEORGE H. LINCOLN, Boston, Mass., head of the house of George H. Lincoln & Co., iron founders, and for years treasurer of the New England Foundrymen's Association, died suddenly June 8, aged 66 years. He was born in Boston July 3, 1846. He had been prominently identified with the iron industry of New England for 30 years. He was a member of the Boston City Club, Aberdeen Club

and Boston Chamber of Commerce, was a Knight Templar and was associated with various scientific and philanthropic associations. He leaves a widow and one son.

EUGENE PITOU, vice-president National Meter Company, 84-86 Chambers street, New York, died June 5 at his home in that city, from apoplexy, aged 72 years. He had been associated for a great many years with the company. He was one of the oldest members of the New York Consolidated Stock Exchange and the Produce Exchange. He was also associated for a time with the Crescent and Standard Oil companies. He leaves a widow, two daughters and a son.

Pittsburgh and Vicinity Business Notes

The Bessemer Gas Engine Company, Grove City, Pa., has increased its capital stock from \$400,000 to \$1,000,000. It is understood that some large plant additions are proposed.

The Jamison Coal & Coke Company, Pittsburgh, has issued a notice of intention to redeem its entire issue of 5 per cent. serial gold bonds to the amount of \$1,754,000 at par and a premium of 2½ per cent. accrued interest on July 1, and further announcing that the interest on these bonds will cease on July 1. The bonds are to be redeemed by the Union Trust Company of Pittsburgh as trustee.

The Fidelity Title & Trust Company, Pittsburgh, trustee of the Pressed Radiator Company of America, incorporated for \$1,250,000, has filed a bill in equity against the latter asking that the court grant a decree for the sale of the property. The bill asks the court to permit a mortgage on the property of \$500,000, given to the trust company as security for a loan on bonds, to become a first lien, and that the bondholders, if they so desire, be permitted to purchase the property at public sale and use the bonds in payment of purchase money. It is claimed that the defendant company has been financially embarrassed for some time and has not sufficient funds to properly operate the plant, located at West Pittsburgh on the Pittsburgh & Lake Erie Railroad.

The Sterling Steel Foundry Company, Braddock, Pa., is making some improvements in its plant. It is erecting a steel addition to the foundry, 80 x 125 ft., to be used as a cleaning department, the contract for the building having been placed with the McClintic-Marshall Construction Company, Pittsburgh. New equipment is being added, consisting of a 185-hp. Westinghouse gas engine, a 10-ton Morgan traveling crane and a Morton shaper. The company has also recently purchased a Speedwell motor truck for local delivery. It makes steel castings exclusively and does not do any machine work. The entire cost of the improvements will be \$25,000, and they will be completed within 60 days.

The Apollo Steel Company, which is erecting a new sheet mill plant at Apollo, Pa., has placed a contract with the McClintic-Marshall Construction Company, Pittsburgh, for its main building, which will have three wings, one 70 x 432 ft., one 40 x 432 ft., and the third 45 x 504 ft. All these wings will be under one roof, which will be of the Aiken depressed bay roof design. The United Engineering & Foundry Company, Pittsburgh, is consulting engineer for the new Apollo plant, and will erect six hot sheet mills and two cold mills. Other contracts placed for the plant are for motors, including a 1400 kw., to drive the hot mills, which went to the General Electric Company; one 30-ton crane, with a 10-ton auxiliary, and two 10-ton cranes to the Northern Engineering Company, with offices in the Machesney Building, Pittsburgh. The McClintic-Marshall Company has also received a contract from the Northern Ohio Traction & Light Company for the erection of three steel buildings for car barns and repair shops, two of the buildings to be equipped with the Aiken depressed bay roof design.

The Standard Bridge Tool Company, Bessemer Building, Pittsburgh, is building a Thomas spacing table with multiple punch for the Hamilton Bridge Company, Hamilton, Canada, and an angle milling machine for the St. Lawrence Bridge Company, Montreal.

The National Roll & Foundry Company, Pittsburgh, has received an order from the Deforest Sheet & Tin Plate Company, Niles, Ohio, for five 28-in. finishing mills and one 28-in. motor-screwdown roughing mill with steam lifting tables.

The Petroleum Iron Works Company, Sharon, Pa., steel plate construction, is making some large additions to equipment in its plant, but is not adding any new buildings. It has placed a contract with the Massillon Bridge & Structural Company, Massillon, Ohio, for one crane runway, 70-ft. span, 560 ft. long, and with the Alliance Machine Company, Alliance, Ohio, for a 15-ton electric traveling crane. It has also purchased one 6-drive, 16 in. x 24 in. Lima switching locomotive, a Hilles & Jones horizontal bending machine, a No. 3 vertical punching machine and a scrap shear from the United Engineering & Foundry Company, Pittsburgh. The yard crane will greatly facilitate and reduce the cost of handling material, and with the new machines the output of the company will be largely increased. It reports business as very good at the present time, some departments operating 20 hours per day.

The puddling and bar iron plant of the Sligo Iron & Steel Company, South Connellsville, Pa., has started up again in part after being idle for sometime. The company has recently received from the United States Government a large order for anchor and chain iron.

F. S. Porter, chief engineer for the additions being made to the Fort Pitt Hotel in Pittsburgh, has placed orders with the Pittsburgh office of the Bruce-Macbeth Engine Company and the Westinghouse Electric & Mfg. Company for the power equipment needed. The orders include three 150 hp. vertical gas engines to be direct connected to 100 kw. generators. Estimates are being taken on a single-acting steam-driven pump with a capacity of 1000 gal. per minute and a 10,000-gal. per hour water heater for the heating plant.

The report that the Whitaker-Glessner Company, Wheeling, W. Va., will soon start work on a large open-hearth steel plant on a site six miles north of Wheeling, bought two years ago, is officially denied. The company states that it still owns the property, but that probably nothing will be done in the matter for a year or more.

The Pittsburgh Air Brake Company, Pittsburgh, has applied for a charter, the incorporators being J. Rogers Flannery, J. Rush Snyder and P. E. Donner. The new company proposes to build a factory in the Pittsburgh district for the manufacture of air brakes, but definite plans have not yet been made.

Tate-Jones & Co., Inc., Pittsburgh, report among their late orders contracts for large oil burning furnaces for the Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, and the Pennsylvania Steel Company, Steelton, Pa.

The Cambria Steel Company, Johnstown, Pa., will add three 60-ton open-hearth steel furnaces to its Franklin works. This will give the company a total of 28 open-hearth furnaces, with a daily output of about 3000 tons.

The Farrell works of the American Sheet & Tin Plate Company at Farrell, Pa., formerly known as South Sharon, broke all records in May for production of tin plate at this plant by over 3000 boxes.

The Rockwell Furnace Company, New York, has opened an office in the Engineers' Building, Cleveland, Ohio, for the sale of furnaces for heat treatment, annealing, tempering, etc. The office will be in charge of George B. Norcross, who will have associated with him Walter F. Johnson, formerly assistant treasurer of the King Bridge Company, Cleveland, Ohio, and E. W. Saunders, of the Carbon Steel Company, Pittsburgh.

The Titan Steel Casting Company, Newark, N. J., has suspended operations for the summer months. President R. E. Jennings says that the plant has been closed for several reasons, among them that prices are low and the company has completed the contracts it had on hand. A very short time ago the company began the erection of an addition to its foundry.

Failures reported by Bradstreet's in May numbered 1109, an increase of 7.6 per cent. over May, 1911, and one-half of 1 per cent. over May, 1908, which previously had shown the largest number for the month of May. Liabilities were \$12,875,879, a decrease of 9 per cent. from April this year and 1.3 per cent. from May, 1911, while they were less than half those of May, 1908.

Iron, Steel and Heavy Hardware Jobbers

The Third Annual Convention at Boston Discusses Questions Bearing on the Interests of Jobbers and Manufacturers—The Missionary Salesman

The third annual convention of the American Iron, Steel and Heavy Hardware Association was held at the Hotel Somerset, Boston, June 4-6. In reality it was the second convention, for the meeting of two years ago was confined chiefly to the details of organization. The growth, the promise, the spirit of cooperation and friendliness, not only between the members but between the jobbers and the many manufacturers who were represented, all indicate that the future of the association will be one of great mutual benefit.

The convention opened Tuesday morning, June 4, with President E. P. Sanderson, of Boston, in the chair. The association was welcomed to Boston by Mayor John F. Fitzgerald, and by J. Randolph Coolidge, vice-president of the Boston Chamber of Commerce, and responses were made by W. H. Grant, Bonniwell-Calvin Company, Kansas City, for the active members, and by George E. Holden, Bryden Horse Shoe Company, Catasauqua, Pa., for the associate members.

The Association's Work Reviewed

President Sanderson in his annual address referred to the organization of the association at Chicago two years ago for the betterment of conditions among the jobbers of iron and steel and heavy hardware in the United States. The objects of the association, he said, were to create and preserve more friendly relations among jobbers, to interchange trade ideas and business methods and to put the business of the members on the high plane which their standing in the business world warranted; also to arrange for better business customs and a more satisfactory method of distributing the products of manufacturers through the well-established channels of trade represented by the jobbers. Due to the neglect of united action by the jobbers, conditions in many cases had become very unsatisfactory and expensive both to manufacturer and consumer.

He granted that the association had not succeeded in making the customers of all its members pay their bills in 30 days, nor had it prevented some jobbers from selling without a profit. However, in spite of the unprofitable year just ended and of disappointments due to factors beyond their control, he believed the membership was of the same mind which prompted them to band themselves together for the common good. He was glad to say that the results obtained in the past year by united action were such as would have seemed a few years ago impossible of accomplishment. With a few exceptions the manufacturers have cooperated with the jobbers. Some of the largest manufacturers in the country decided not to put in force certain plans after considering the effect they would have on the jobbing trade. Some of the plans outlined when the association was formed two years ago are now seen to be plainly impossible, but in other respects the situation is clearing so rapidly that some of the suggestions then made are no longer necessary. He believed that the position of the heavy hardware and iron and steel jobber in most sections is much better than for many years, a consummation largely due to the united efforts of the members of the association.

After remarks by T. James Fernley, secretary-treasurer of the National Hardware Association, and Fred L. Greeley, president of the New England Iron and Hardware Association, a most interesting address was made by Fred Krebs, general manager of sales of the Cambria Steel Company, on "The Relation of the Steel Manufacturer to the Jobber."

The Missionary Salesman

Wednesday evening was devoted to a general discussion of the missionary salesman. A paper was read by Charles M. Roehm, Roehm & Davison, Detroit, on "The Missionary Salesman from the Jobber's Standpoint," and one by Dr. G. C. F. Williams, Capewell Horse Nail Com-

pany, Hartford, Conn., on "The Missionary Salesman from the Manufacturer's Standpoint."

In the debate that followed, the general expression was that the missionary salesman is a necessary institution, but that abuses have grown up through the employment of men who are not trained for their special task or are not scrupulous in their methods and hence become a demoralizing influence in the trade. The extreme view taken by a few members was that the missionary salesman should be eliminated completely.

A resolution was adopted calling for the appointment of a committee of active and associate (manufacturing) members to investigate the policy of selling by missionary salesmen and present some plan to obviate the objectionable features. The committee as named consists of the following: Henry Bodevin, chairman, N. Langer & Sons, Brooklyn, N. Y.; A. K. Edwards, Edwards & Chamberlain Hardware Company, Kalamazoo, Mich.; C. M. Roehm, Roehm & Davison, Detroit, Mich.; Charles W. Henderson, Arthur C. Harvey Company, Boston; H. E. Tredway, John Ernsdorff Iron Company, Dubuque, Iowa; G. C. F. Williams, Capewell Horse Nail Company, Hartford, Conn.; W. J. Kent, Revere Rubber Company, Boston; J. W. Kiser, Phoenix Horse Shoe Company, Chicago; Warren J. Chase, Rowe Calk Company, Hartford, Conn.; George Dryden, Charles P. Dryden, Chicago.

At an executive session Thursday morning a paper prepared by F. W. George, Shattuck-George Iron Company, Wichita, Kan., on "The Selling Policy," was read by L. H. Williams, Williams Hardware Company, Minneapolis, Minn.

In the discussion of the paper Charles E. Faeth outlined the one price selling policy which his company had adopted. He argued for selling goods as goods and not by name, saying that the ultimate consumer paid for the differences in brands and for the missionary work and advertising necessary to put them on the market. The discussion was continued by Mr. Junquist, Los Angeles Heavy Hardware Company, George C. Finley of Buffalo, C. M. Roehm and L. H. Williams.

New Officers

The election of officers was held Thursday afternoon and the following as reported by the nominating committee were unanimously chosen:

President—Charles E. Faeth, Faeth Iron Company, Kansas City, Mo.

First Vice-President—Charles M. Roehm, Roehm & Davison, Detroit, Mich.

Second Vice-President—E. W. C. Waterhouse, Waterhouse & Lester, San Francisco.

Executive Committee—H. E. Tredway, John Ernsdorff Iron Company, Dubuque, Iowa; Fred Guethlein, S. B. Schulte Sons Company, Cincinnati. The members of the committee who hold over are J. A. Gregg, Nichols, Dean & Gregg, St. Paul, Minn.; Charles C. Lewis, Chas. C. Lewis Company, Springfield, Mass.; J. Henry Ruwe, Ruwe Bros., Brooklyn, N. Y.; George E. Enos, Enos & Sanderson Company, Buffalo, N. Y. The president and vice-presidents are members of the committee.

The convention voted to meet at Buffalo, N. Y., next year.

E. R. Yarnelle, secretary-treasurer, was re-elected by the executive committee. Mr. Yarnelle was toastmaster at the banquet Thursday evening. Among the speakers was James T. McCleary, secretary of the American Iron and Steel Institute.

The Canton Machinery Exchange, Canton, Ohio, reports among its recent sales a Davis-Bournonville acetylene welding outfit to the C. R. Wilson Body Company, Detroit, Mich., and a Silver Mfg. Co.'s medium-sized drill press and portable blacksmith forges to the Binns Machine Company, Canton.

Edgar Thomson Improvements

Indication of the Continuing Importance of the Pittsburgh District and of Larger Exports of Steel Rails

The announcement by the Steel Corporation that it will spend about \$8,000,000 in improvements and extensions at the Edgar Thomson steel works of the Carnegie Steel Company at Bessemer, Pa., as already given in *The Iron Age*, is of more than ordinary interest. In years gone by the Edgar Thomson rail mills were the largest in the country, and many extraordinary records for output have been made at that plant, very close to 100,000 tons of heavy and light section rails having been rolled in a single month. The great development west of Chicago in the past five years and the large amount of new railroad construction in that part of the country emphasized strongly to the officials of the Steel Corporation the necessity of more rail capacity in the Chicago district, the result being the building of the Gary rail mills with a capacity of about 4000 tons every 24 hours. The saving in freights of about \$3 per ton by furnishing rails rolled at Gary to the Western roads, instead of Pittsburgh rails, was also an important factor and had large influence in the building of the Gary mill.

There have been times when the Edgar Thomson rail mills, with a monthly capacity of close to 75,000 tons, have been sold up for more than a year ahead; but with the increase in capacity in the Chicago district, much tonnage that formerly came to Edgar Thomson has been diverted to Gary and South Chicago. The result of this has been that the Edgar Thomson works for the past three or four years have not operated in full, seldom running to more than 50 to 60 per cent. of capacity and very often at a less rate. The lack of open-hearth steel capacity also worked against the plant, and for about five years the Carnegie Company has been rolling its open-hearth steel rail orders at the Youngstown, Ohio, works, the other resort being to bring open-hearth blooms over from Homestead; reheat them at Edgar Thomson and then roll them into rails. This was expensive and was only done when it was not thought advisable to interfere with the rolling schedules at the Ohio works. Since the Edgar Thomson rail mills had a low rate of freight to the seaboard most of the Steel Corporation's export orders for rails have been rolled there; and but for this trade, which has been very considerable in the past few years, operations at Edgar Thomson would have been on a still lighter basis. The present Edgar Thomson steel works has four 12-ton converters, giving it a monthly capacity when running full of about 80,000 tons of ingots, or roughly between 70,000 and 75,000 tons of finished rails. The addition of fourteen 60-ton open-hearth furnaces will mean close to 65,000 tons of steel per month or nearly 60,000 tons of rails, so that the total monthly capacity will be about 140,000 tons of rails.

The conditions that now govern the placing of steel rail business in the Pittsburgh district are not likely to change in the near future, so that naturally only a small part of the above large tonnage will be sold to domestic railroads east of Chicago and in the Pittsburgh district, these being the roads from which the Edgar Thomson mills have been receiving their rail orders for five years or more. The natural assumption is that the Steel Corporation intends to cultivate more and more foreign trade in rails and that most or all of the export orders will be sent to Edgar Thomson for rolling.

The remodeled and enlarged rail mills at Bessemer will again give the Pittsburgh district the largest individual rail mill in the country. As time goes on, it is probable that the open-hearth capacity at Bessemer will be increased materially and that eventually the works there will become strictly an open-hearth plant, as is the case with Duquesne, which has not rolled any Bessemer steel for several years and is also the case with the Homestead steel works. The latter contains a Bessemer steel plant but it is now regarded as obsolete and will probably never again be operated. The fact that the Steel Corporation will spend so large a sum within the next few years in betterments at the Edgar Thomson works was very gratifying to Pittsburgh interests. It is regarded as a direct refutation of the statement made so often in the last three or four years that the steel business was gradually drifting away from Pittsburgh.

Lake Superior Iron Ore Shipment

Shipments of Lake Superior iron ore from upper lake docks in May were 5,919,074 gross tons, as compared with 3,684,819 tons in May, 1911, an increase of 2,234,255 tons. The large place the Hill mines will take in the ore movement of this year is indicated by a total of 1,910,068 tons sent over the Great Northern dock at Superior, Wis., last month. From the new Cuyuna range the shipments last month were 21,239 tons, as against 12,554 tons in May, 1911. The shipment by ports in May, 1912, and 1911, and the totals to June 1 in the two years were as follows in gross tons:

	May, 1912	May, 1911	To June 1—	
			1912	1911
Escanaba	712,359	436,008	792,889	529,540
Marquette	356,914	204,093	356,914	218,931
Ashland	513,484	226,528	521,772	267,865
Superior	1,931,307	1,239,153	1,995,723	1,315,892
Duluth	1,276,027	896,113	1,294,264	947,155
Two Harbors	1,128,983	682,924	1,161,554	737,081
	5,919,074	3,684,819	6,123,116	4,016,464

The percentage of the total to June 1 sent from Minnesota mines was 72.7, against 74.7 per cent. to June 1, 1911.

New Stripping at Hill Mines

D. M. Philbin, manager of the Great Northern iron ore properties, has contracted with Winston Brothers, Minneapolis, to strip the Adams mine adjoining the Monroe-Tener, near Chisholm, Minn. This is in pursuance of the recent announcement that the Hill lands would be worked by the Hill interests, and operations thus early are made possible by the surrender by the Steel Corporation of certain lands in advance of January 1, 1915. Attention is called to the fact that this mine is not to be confused with the old Adams mine of the Steel Corporation, which is located near Eveleth, Minn., near the Fayal. The Adams mine in the Chisholm district has a large body of ore. It is expected that in two years, or at least by the time the cancellation of the Steel Corporation lease becomes effective, the mine will be a shipper. The contract just let calls for the removal of 5,000,000 cu. yd. It is stated that another stripping contract will be made by the Great Northern ore department involving 2,000,000 cu. yd., the property being located in Section 58-19.

Sun Power Steam Engine

An engine utilizing steam at less than atmospheric pressure has been developed to furnish power from the steam generated by the heat of the sun absorbed in the power plant designed by F. Shuman, which was illustrated in *The Iron Age*, September 28, 1911. This engine is of the four-valve type and has a cam-operated valve mechanism arranged to open and close very rapidly. The total clearance space is approximately 1 per cent. of the piston displacement and the valves are located so as to make the losses due to clearance a minimum. The cylinder diameter is 24 in. and the stroke the same. The engine is double acting with admission valve seats on the barrel of the cylinder near the end and exhaust valve seats in the heads. In general appearance the engine does not differ from others of the same size, 20 hp., except that its working parts are light and the connecting rod is rather long.

Several tests were made of this engine by Prof. R. C. Carpenter, Cornell University. With steam about 1 lb. above atmospheric pressure and a vacuum of 28 in. the engine requires 31.6 lb. of steam per brake horsepower, and with the same steam pressure, but with the vacuum increased 0.8 in. the steam consumption was 28.8 lb. Numerous other tests made with a steam pressure of approximately 8 lb. absolute or 6.75 lb. below atmospheric pressure gave a steam consumption of 37.8 lb. with a 27-in. vacuum and 35.7 lb. with a vacuum of 28.66 in. A comparison of these results with the Rankine cycle gave efficiencies varying from 43.8 to 52.4 per cent. depending upon the load and the steam pressures.

The Perry Iron Company, Erie, Pa., states that the increase in its bond issue from \$240,000 to \$500,000 is to provide additional working capital and to take care of small plant improvements. No large extensions or betterments will be made at this time.

Imports of Ferrosilicon and Other Ferroalloys in 1911

The Bureau of Statistics of the Department of Commerce and Labor has just published a detailed statement of imports of merchandise to the United States in the quarters ending September 30 and December 31, 1911. It makes possible a statement of the imports of ferrosilicon and other ferroalloys for the year 1911. In the table below the imports of ferrosilicon are stated in gross tons by quarters for the past two calendar years:

Quarter ending	15 per cent. silicon or less.	More than 15 per cent silicon.
	Duty \$5 per ton.	Duty 20 per cent.
March 31, 1910.....	400	1,752
June 30, 1910.....	750	2,273
September 30, 1910.....	425	2,120
December 31, 1910.....	665	3,005
March 31, 1911.....	...	2,262
June 30, 1911.....	...	1,609
September 30, 1911.....	...	912
December 31, 1911.....	...	1,481

There were no imports of ferrosilicon containing 15 per cent. silicon or less in the calendar year 1911. The imports of ferromanganese were 25,170 tons in the first quarter of last year, 21,197 tons in the second quarter, 15,439 tons in the third quarter and 18,457 tons in the fourth quarter, making a total of 80,263 tons for the year. The imports of spiegeleisen for the year were 20,971 tons. The ferrophosphorus imports were 186 tons. Of tungsten or wolfram metal and ferrotungsten the imports were 115.5 tons. The imports of molybdenum and ferromolybdenum were 8.5 tons, and of ferrovanadium 1.7 tons. Chrome and ferrochrome imports, valued at \$200 a ton or less, were 240 tons; valued at more than \$200 a ton, 13.5 tons.

An Automatic Fire Alarm

For installation in connection with the Grinnell sprinkler system, the General Fire Extinguisher Company, Providence, R. I., has developed a device for automatically giving an alarm of fire. It is known as the straightway alarm valve and consists of a device which causes the water flowing through a sprinkler to put a gong on the outside of the building in operation. In the riser traversed by all the water going into the sprinklers a valve is installed and when the flow starts a rubber-faced clapper is raised from its bronze seat and permits the water to flow to a water motor mounted on the inner face of the outside building wall. This motor consists of a small bucket wheel in a metal casing with its shaft extending through the wall and carrying on its outer end a striker which is rotated by the motor shaft and rings a large gong on the outside of the wall. The striker and the gong are inclosed in a galvanized-iron hood to protect them from destruction by snow, bird's nests, etc., and the motor is mounted inside the building to prevent freezing. If desired an alternate arrangement of having the alarm valve cause the water to flow into a magnetic circuit closer so as to start the ringing of an electric gong can be substituted.

The Production of Abrasives in 1911

The abrasive industry in the United States showed a gain in 1911 compared with 1910, according to W. C. Phalen, of the United States Geological Survey, in an advance chapter from "Mineral Resources of the United States" for 1911. Though the total value of the abrasive materials entering the trade fell off, the decline was in the importation and not in the domestic production, which increased slightly in value. The value of the natural abrasives produced increased \$119,958, which was more than enough to offset the decrease in the value of the artificial abrasives produced. The value of the former was \$1,526,763 for 1911, against \$1,406,805 in 1910. The output of artificial abrasives last year was valued at \$1,403,040, against \$1,604,030 in 1910.

The value of the abrasive materials consumed in the United States in 1911 was \$3,725,223, of which \$3,019,803 worth was of domestic production. The imports were valued at \$705,420, against \$1,223,827 in 1910 and \$653,779 in 1909. In the natural abrasive industry gains were shown in the production of millstones and the quarry products made in connection with them, such as chasers

and drag stones, of grindstones and pulpstones, of abrasive garnet, and of infusorial earth and tripoli. There was a very slight decrease in the value of oilstones and scythestones produced and a small decrease in the production of pumice. The greatest decrease was shown in the production of emery.

A Cut Nail History

"Romance of the Cut Nail Industry" is the title of an admirable brochure by John H. Rennard, Wheeling, W. Va., which has been issued in behalf of the La Belle Iron Works, Steubenville, Ohio. The booklet gives an interesting history of the cut nail industry in the Wheeling district from the time the first factory was built at Steubenville in 1808. The various factories established in the district since that time are enumerated and the characteristics of the old nailers are set forth in picturesque detail. A narrative is given of the great nailers' strike which started June 1, 1885. Mr. Rennard states that "while the annual output of cut nails has been considerably reduced, the ironmasters turning their attention to other branches of the business, the La Belle cut nail still retains the Wheeling reputation for superiority." In connection with the booklet a folder is presented which illustrates the various sizes and patterns of cut nails now manufactured by the La Belle Iron Works.

Chinese Steel Makers Decline Japanese Alliance

The Mining and Scientific Press, San Francisco, Cal., says in its issue of June 1: "Shareholders in the Han-Yeh-Ping Iron & Coal Company, which operates blast furnaces and a steel plant at Hanyang, Hupei province, China, producing 140,000 tons of pig annually, have unanimously refused to sanction an agreement made by the managing director to convert the company into a joint enterprise with Japanese capitalists. The supply of ore for the Japanese Government iron works near Wakamatsu has been largely drawn, under a 15-year contract, from mines owned by the Chinese, and the proposed arrangement, which would have been advantageous to the Japanese, who have loaned \$4,500,000 to the Chinese company, which is capitalized for \$18,000,000, did not meet the approval of either the Chinese shareholders or China's authorities."

Story of the Engine Indicator

The American Steam Gauge & Valve Mfg. Company, 208-220 Camden street, Boston, Mass., has brought out a booklet entitled "Progress" by Elbert Hubbard, which is also named "a story for executives and engineers." Starting with the invention of the steam engine by James Watt in 1764, Mr. Hubbard works up to the indicator and shows in a most engaging manner the value of this device to all those who have anything to do with engines. From a discussion of general principles in connection with indicators, an easy transition is made to the special features and advantages of the American-Thompson indicator made by the American Steam Gauge & Valve Mfg. Company.

The business of the Universal Machine Screw Company, Hartford, Conn., has so increased that it has opened a New York office in charge of C. D. Schmidt on the corner of Broadway and Canal street, with entrance at 276 Canal street. The company not only manufactures for the trade the well-known five-spindle automatic screw machine, but also operates a large number of these machines in its own plant. It has large orders on hand for machine screw products of all kinds and descriptions, welcoming inquiries for special, clean and accurate work. Mr. Schmidt, the New York manager, has been prominent in the machine screw product field for a number of years.

The Wells Brothers Company, Greenfield, Mass., manufacturer of taps and dies, has opened a store in Boston, at 163 Oliver street, in order that better service may be offered to the trade in that city and vicinity. A comprehensive stock of all screw-cutting tools is carried, and quick deliveries will be made possible. John E. Chipman is the manager of this new store.

The Steel Corporation Dissolution Suit

The hearing of testimony in the Government suit against the United States Steel Corporation was resumed in New York City Monday, June 10. Oakleigh Thorne, former president of the Trust Company of America, and Osmund Phillips, financial editor of the New York Times, were examined in regard to the circumstances attending the panic of October, 1907, the outcome of which was the purchase of the Tennessee Coal, Iron & Railroad Company by the United States Steel Corporation. Mr. Thorne repeated the story of the run on his bank about as he told it to the Stanley Committee.

C. W. Bray, who was president of the American Sheet & Tin Plate Company up to three years ago and before that was president of the Beaver Tin Plate Company, was questioned at length regarding the names of the principal makers of tin plate machinery. The Government contends that the American Tin Plate Company, the original consolidation of tin plate interests, made contracts with the manufacturers of such machinery to take their entire output so that independent tin plate makers could not purchase any. Mr. Bray testified to a long list of tin plate plants that were dismantled and their machinery removed after the American Tin Plate Company acquired them. One of the stipulations in the contract of sale, he said, was that no owner of a plant was to re-engage in tin plate business within a radius of 1500 miles in a period of 15 years. He testified that a few plants were sold to independents who continued to be competitors of the consolidation. He was also examined to some extent regarding the Gary dinners. The Beaver Tin Plate Company was valued at \$250,000 on its books and was sold to the American Tin Plate Company at a price between \$300,000 and \$400,000.

On Tuesday W. P. Worth, of the Worth Brothers Company, Coatesville, Pa., was also examined regarding the Gary dinners. He testified that he had attended all of them and that they had furnished a guide for those in the business. R. V. Lindabury, counsel for the Steel Corporation, drew from Mr. Worth the statement that Judge Gary, so far as he knew, never attempted to lay down a rule for the rest of the manufacturers or attempted to bind any of them and that he always gave the other manufacturers advice counseling publicity. The dinners continued for a little more than two years and came to an end when it was concluded they should end, but he could not say just what the reason was. He said that Judge Gary never said anything about prices, but would sometimes say that it was time to make a concession. He also told of the plate and boiler tube associations which antedated the Gary dinners. After the plate association was dissolved meetings continued to be held, but there was no agreement. Each manufacturer told what price he intended to make. Mr. Worth said it was desirable and necessary to find out what other manufacturers were doing, what orders they had booked and what their prospects were. Before the conferences were held the individual manufacturers had to get their information from the customers if they got it at all.

Charles S. Trench, publisher of the American Metal Market and a dealer in metals, said he was formerly head of the Norristown Tin Plate Company, dipper of tin plate, not making its own black sheets. After the American Tin Plate Company was formed he said he was unable to buy black plate from the mills that had previously supplied him but had gone into the consolidation, as they said they needed it themselves. He finally sold out to the American Tin Plate Company for \$50,000, which he said was a fair price. He was examined to some extent regarding pig tin, which he declared is cornered in the London market and that the corner is practically continuous. In recent years, when he needed pig tin he had sometimes been able to buy it from the United States Steel Products Company, the export branch of the Steel Corporation, at fair prices. He further testified as to statistics published in book form by his paper which were put in evidence, stating that the prices so compiled were largely obtained from *The Iron Age*.

The Oxweld Acetylene Company, 79 Wall street, New York and People's Gas Building, Chicago, announces that it has succeeded to the oxy-acetylene apparatus business of the Linde Air Products Company.

New Publications

Valuation of Public Utility Properties. By Henry Floy. Size, 6 x 9 in.; pages, 390. Bound in cloth. Price, \$5.00 net. Published by the McGraw-Hill Book Company, 239 West Thirty-ninth street, New York City.

The author of this work has been actively engaged in valuing street railroad properties to determine values for public service commissions and has made a study of the various phases of the subject. The book, which is a summary of recent important valuation cases, gives considerable information on the general question of the appraisals of street railroad properties with more especial reference to those in Greater New York. In this connection actual figures are given to indicate clearly the methods followed by the parties concerned in the principal New York City appraisals which have been involved in the proceedings before the Public Service Commission of the First District of New York. The information presented by the author in various papers before engineering societies has been included, although it has been revised and amplified for the purpose of incorporating it in the volume. The methods of appraisal are dealt with in a general way in the work which is designed to reveal the tendencies of public valuation practice together with the lines likely to be followed in the future by commissions acting for the public. In the book no attempt is made to hold a brief either for the necessity of valuing property on the one hand or the injustice of doing so on the other. A number of examples of valuation, together with sample forms and a number of diagrams of prices, annual charges, etc., are included.

Report on Revaluation of Railroads and Canals of New Jersey. By Charles Hansel, member of the American Society of Civil Engineers, 43 Exchange Place, New York, expert in charge. Pages 465; cloth bound. Printed and issued by the State of New Jersey.

This report gives in great detail the manner in which valuations have been made for the State of New Jersey of the various railroad and canal properties in that commonwealth. It is especially interesting from the fact that the reasons have been carefully set forth through which conclusions were deduced. The discussion of the various elements entering into valuations cannot but afford to others engaged in similar appraisals illuminating ideas as to how the complicated questions connected with such appraisals should be handled and disposed of. At a public hearing on the subject of franchise taxes held at Trenton, N. J., January 23, 1912, Robert W. de Forest, vice-president and general counsel of the Central Railroad Company of New Jersey, in referring to Mr. Hansel's work, stated that this method of franchise valuation seemed to him, "for the first time, a scientific one and, properly carried out in its application, the fairest that has yet been suggested."

The Van Dorn & Dutton Company, Cleveland, has recently appointed Alfred Herbert, Ltd., 47 Boulevard de Magenta, Paris, selling representative of its portable tool department for France, Spain, Portugal and Belgium. The Paris house mentioned is a branch of Alfred Herbert, Ltd., Coventry, England, a large manufacturer of tools and for some years representative of the portable tool department of the Van Dorn & Dutton Company in the British Isles. The Cleveland company has also recently appointed Frank Saunders, Ltd., Sydney, Australia, as selling representative of its portable tool department for Australia and New Zealand. It reports that in the past two months it has had a largely increased sale for its hard service portable electrically operated drills and reamers.

An officer of the International Harvester Company states that because of reports on crop prospects received through its own sources of information it has decided to increase the season's output by 10,000 harvesting machines.

Corrigan, McKinney & Co. will blow in their new No. 2 blast furnace in Cleveland, Ohio, about June 15. It will run on basic, malleable and Bessemer iron. This stack was completed about a year ago and has since been standing unused.

Jones & Laughlin Chain Catalogue

A new catalogue of chains and attachments has been issued by the Jones & Laughlin Steel Company, Pittsburgh, Pa. It is a most attractive and beautifully printed work, of a convenient size for desk or pocket ($4\frac{1}{2} \times 7$ in.) and illustrated in a manner not surpassed by the publishers of the highest grade books. One of the notable features of the catalogue is the number of illustrations in double tint, showing in a picturesque fashion the making and testing of chains. The illustrations for the chapter headings are printed in three colors. In illustrating the various grades of chains a new departure is noticed in the showing of several sizes of each style of chain, thus giving a sense of comparison and also in extending the illustrations to the page margins, thus giving a sense of continuity to the chains.

After a brief introduction the catalogue takes up a discussion of how to properly care for chains to prolong their life and keep their usefulness unimpaired. Another chapter is devoted to the testing and inspecting of J & L chains, another to hand and machine-made chains and another to useful data concerning chains. There are two editions of the catalogue, one bound in russet leather, die-stamped in gold ornamentation, the other in boards, die-stamped in white. It will doubtless be carefully preserved for its attractiveness as well as for the useful information it contains.

Youngstown Sheet & Tube Company's New Furnace

The Youngstown Sheet & Tube Company has begun the building of a fourth blast furnace at Youngstown, Ohio. It will be practically a duplicate of the three present furnaces, but will embody such new features as have been found advantageous in modern furnace practice. It will be 22 ft. 6 in. in diameter at the hearth, 29 ft. at the mantel and 93 ft. high over all, and will be equipped with four Kennedy stoves, 22 x 102 ft., with an accompaniment of washer mains, etc. The contract for the plate work for the furnace stoves, etc., has been placed with the William B. Pollock Company, Youngstown. Eight new 500-hp boilers will be added to the present battery of 26 in the blast furnace boiler house. The blowing equipment has not yet been contracted for. Contracts have been placed with the General Electric Company for one 3500-kw turbine and generator with 35-kw exciter set and switchboard, and with the Crocker-Wheeler Company for two 1000-kw self-exciting motor generator sets.

The Farm Machinery Journal, Winnipeg, Canada, tells of the largest trainload of agricultural implements ever transported in a single consignment arriving there, comprising 100 flat cars, each carrying an Oil Pull traction engine from the M. Rumely Company, LaPorte, Ind. The duty on the shipment was \$62,000. The engines will be distributed to farmers who purchased them, in Manitoba, Alberta and Saskatchewan. They were of three sizes, the average weight being 12 tons each.

A hearing on the 1912 flange standards, recommended jointly by the American Society of Mechanical Engineers, the American Society of Heating and Ventilating Engineers and the National Association of Master Steam and Hot Water Fitters, is to be given by the Department of Yards and Docks, United States Navy, Washington, D. C., June 17. It appears that valves, fittings and the like are to be bought and the hearing is to determine the commercial aspect of specifying in accordance with the 1912 standard.

The National Commercial and Fifth Avenue News, Marbridge Building, New York, in its issue for May 15, presents an interesting article on "Industrial Hygiene and Mutuality at the National Cash Register Company's Plant" at Dayton, Ohio, contributed by Dr. William H. Tolman, director of the American Museum of Safety. The article is copiously illustrated and describes in considerable detail the care taken by the company in looking after the welfare, comfort and general advancement of the employees.

Important Republic Iron & Steel Company Improvements

Concerning the reports of improvements to be made by the Republic Iron & Steel Company, Chairman John A. Topping states that the executive committee at its last meeting authorized the construction of four new modern merchant bar mills at Youngstown, Ohio, to supplant certain mills of an obsolete type at the Brown-Bonnell and Mahoning Valley works. On completion of these improvements the Mahoning Valley works will be abandoned and dismantled and the complete rehabilitation of the Brown-Bonnell works as a modern steel plant will have been accomplished.

In addition to the new finishing mills the executive committee also authorized the construction at Haselton of a by-product coke works of 1000 tons daily capacity. This plant when completed will place all Northern blast furnaces on substantially a self-contained basis for coke, and the waste gas generated in the coking operation will largely supplant the coal now used for heating purposes in the finishing works at Haselton.

The cost of the improvements has been financed, bonds to the amount of \$2,000,000 having been sold. The improvements will effect important economies in operation, while the finishing capacity will be somewhat increased and the output of coke added to by approximately 70 per cent.

German Imports of Iron Ore

Germany's imports of foreign iron ore rose from 3,957,000 tons in 1902 to 10,812,600 tons in 1911. Exports of ore from Germany, which amounted to 2,868,000 tons in 1902 and rose to 3,068,000 tons in 1908, dropped last year to 2,581,700 tons. This decline is due to the fact that Belgium, which is the chief buyer of German ore, is turning more and more to the Briey district of France for ore that it had hitherto been getting of poorer quality from the Luxemburg-Lorraine district. The following table shows how the imports from the leading countries have shifted in the past four years:

Metric tons	1908	1909	1910	1911
Sweden	3,137,800	2,880,400	3,249,000	3,502,200
Spain	1,978,900	2,460,700	2,861,200	3,154,400
Russia	528,100	552,100	779,400	868,000
France	919,500	1,368,600	1,773,800	2,122,900
Belgium	282,000	289,500	326,600	297,200
Austro-Hungary ...	300,800	231,800	202,000	158,400
Greece	187,500	132,600	82,000	119,000
Algiers	166,300	223,300	224,700	307,500

In point of increase for the three years France leads all other countries with a gain of 1,203,400 tons, while Spain follows with one of 1,175,500 tons. Imports from Sweden increased by only 364,400 tons, but Russia gained about 340,000 tons. The big gain from France was of course due to the rapid development of the Briey district, where a number of the leading German companies have acquired ore lands and have begun to exploit them.

At its annual meeting in Ottawa this week the Canadian Press Association appointed a committee to wait on the Government with a petition to make typesetting machines and parts of printing presses free of duty. Typesetting machines were among the articles whose free admission into Canada from the United States was provided for in the Knox-Fielding reciprocity agreement that was rejected at the polls last September.

The United States leads the world in the exportation of typewriters. In the single month of April its exports under that head were valued at \$1,165,839, as compared with \$138,232 in April, 1897, while for the complete fiscal year which ends with June the total will be about \$12,000,000, or eight times as much as in 1897, the earliest year for which a separate record of this trade was made by the Bureau of Statistics.

The demand of the molders in the Pittsburgh district for an advance in wages from \$3.50 to \$4 per day will likely be compromised by an advance of 20 cents per day, or from \$3.50 to \$3.70 for nine hours, effective from July 1.

The Machinery Markets

Trade conditions in the machinery industry in comparison with a week ago continue about the same when the entire country is viewed. Several of the manufacturing centers are not as busy as they might be, but in others an improvement is felt and in nearly all a fair average of activity is maintained. New York dealers are of the opinion that June will sustain its reputation as a good month for business. An improvement is noted in New England where the demand is especially strong for grinding machines and automatics. Trade has moderated somewhat in Philadelphia, but the activity in industrial plants continues and the outlook is regarded as favorable. Small orders predominate in Cleveland where many makers of machinery note some improvement and the foreign demand is reported as twice that of last year at this time. The railroads are doing some quiet buying in Cincinnati, but business, both domestic and export, tends to be slow. The Atchison, Topeka & Santa Fé Railroad has added to its list of requirements now before the trade in Chicago and some good business has been done in that city. The demand for single tools is the feature in Detroit and there have been enough sales to cause a betterment in the trade. The Central South is quiet, although in Birmingham substantial demand continues, especially for wood working equipment and the June outlook is better than usual. There have been no changes worthy of note in St. Louis where there has been a good run of small business. On the Pacific coast the best demand is for irrigation equipment and road building machinery, although the trade is looking forward to calls from Mexico for mining machinery. Political conditions across the border are expected to become more tranquil at an early date and permit the machinery trade with Mexico to become normal.

New York

NEW YORK, June 12, 1912.

A generally satisfactory state of trade continues in the New York machinery market. While no large individual requirements have come to notice in the last week either as inquiries or business closed, the aggregate of sales and inquiries has been sufficient to maintain the "fair" conditions of the last few weeks. Important sellers of machine tools say they expect June to live up to its reputation of being a good month and that it will not fail to do so if inquiries now in hand materialize. The representative of a turret lathe manufacturer reports an excellent demand from abroad. Some buying has been done of recent date by the Sloan & Chace Mfg. Company, Newark, N. J. Shapers, millers, lathes and other tools to the value of about \$10,000 were purchased and plans are under way by the same company for larger expenditures in the next few months for equipment needed to enlarge its plant. Four manufacturers of printing presses and accessories in Northern New Jersey are affected by a strike declared by the International Association of Machinists. Demands are made for a new wage scale and a shorter work day as follows: To November 30, 1912, 8½ hours; from December 1, 1912, to June 30, 1913, 8¼ hours, and from July 1, 1913, and afterward, 8 hours. A part of the business of the Safety Car Heating & Lighting Company, Jersey City, N. J., is yet to be placed. A large number of New York representatives of the trade are in Atlantic City this week in connection with the machine tool exhibit which is a feature of the convention of the Master Mechanics' and Car Builders' Association, and which usually lays the foundation for future business.

Inman E. and James M. Stower have bought a controlling interest in the H. H. Lovejoy Company, Cambridge, N. Y., manufacturer of the Cambridge steel plow, and will carry on a business under the corporate name of the Cambridge Steel Plow Company.

A fire covering two city blocks destroyed the planing mill of A. W. Booth & Brother at Bayonne, N. J., June 9. The loss is estimated at \$250,000. Plans are already under way for rebuilding.

Unconfirmed reports are to the effect that the Keystone Watch Company, Philadelphia, Pa., will remove its plant to Newark, N. J., and consolidate with the Crescent Watch Case Company of that city. The two companies are now under the same control and the removal would mean the employment of 1800 men.

The Warren Lubricant Company, Buffalo, N. Y., whose plant was recently destroyed by fire, has had plans prepared for a new building. All the necessary equipment has been purchased with the exception of a 150-hp. boiler.

The Hobart Water Company, Hobart, N. Y., will build a water-works system, including a sand filter of 200,000 gals. capacity per day. Engineer, Morrell Vrooman, City Hall, Gloversville, N. Y., is receiving bids.

The Central Clay Products Company, North Tonawanda, N. Y., recently incorporated with a capital stock of \$75,000, will construct a large paving and building brick manufacturing plant at Beach Ridge just east of

that city, to cost \$35,000. The plant will consist of ten buildings covering an area 500 feet square; four oblong down draft kilns and a metallic radiation drier will be the principal buildings. H. Jason Knapp, North Tonawanda, is president.

The Case Bros. Cutlery Company, Springville, N. Y., has let the contract for the construction of its new factory to the Tuna Mfg. Company, Bradford, Pa. The building will be 40 x 100 ft., brick and steel.

The Pyro Extinguisher Company, Syracuse, N. Y., has filed articles of incorporation and will engage in the manufacture of fire extinguishers. The company's capital stock is \$40,000. Wilbur Allen, E. D. Allen and Walter H. Tibbals are the incorporators.

The Welsh Grape Juice Company, Westfield, N. Y., has let a contract to the Duroithic Company, Buffalo, for erection of an additional factory building, 110 x 160 ft., of reinforced concrete. An equipment of presses and bottling machinery will be installed.

The Schrader Hat Company, Matteawan, N. Y., has been incorporated with \$50,000 capital stock for the manufacture of hats of all kinds and a factory will be built. The directors are G. A. Schrader, Matteawan, C. H. Watson, New York City, and R. W. Jameson, Yonkers.

Marshall E. Hoyt, Troy, N. Y., manufacturer of brushes, will build a two-story factory on Twentieth street, that city.

The Shuttleworth Brass Company, Amsterdam, N. Y., is receiving bids for an addition to its mill, 28 x 150 ft., two stories, and a one story office building, 40 x 50 ft., of brick and hollow tile construction.

County Purchasing Agent Frank X. Wood, 406 Court House, Syracuse, N. Y., is receiving bids for a stone crushing plant to be installed in the county quarries at Jamesville, N. Y.

The foundry of the Standard Compound Company, Albany, which was burned June 4 with a loss of \$30,000, is to be reconstructed at once.

The Northern Motor Car Company, Albany, N. Y., has been incorporated with a capital stock of \$25,000 to manufacture automobiles and accessories. A manufacturing plant is being arranged for. R. D. Cannon and A. P. James, Albany, and J. S. McClellan, Utica, are the incorporators.

The plant of the Albany Foundry & Nickel Plate Company, Albany, which was destroyed by fire June 4 with a loss of \$100,000, is to be rebuilt at once.

The organization of the Bradford Textile Company has been completed at Bradford, N. Y., with a capital stock of \$25,000, and a plant for the manufacture of textile fabrics will be established and equipped.

The Shredded Wheat Company, Niagara Falls, N. Y., will build an extensive addition to its plant on Erie street which will double its capacity.

The Chic Mfg. Company, Rochester, N. Y., has been incorporated with a capital stock of \$75,000 to manufacture egg carriers and other specialties for which a plant will be built. J. H. Cole, H. H. Mosher and E. L. Ansteth are the directors.

The Merritt Mfg. Company, Lockport, N. Y., manufacturers of machinery, will build a three story factory of stone at Market street and the Canal race. The

company will also install a power plant and sell its surplus power.

The Covert Motor Vehicle Company, Lockport, N. Y., manufacturers of automobile axles, has purchased land adjoining its plant on Grand street, and is having plans prepared for an extensive addition to its manufacturing facilities.

The Union Can Company, Rome, N. Y., will build an addition, 50 x 150 ft., three stories, to its warehouse and plant at Armstrong and Dockstader streets. W. R. Ayars is superintendent.

The Howard Iron Works, Buffalo, is receiving bids for the erection of a machine shop, 55 x 182 ft., one story, of structural steel and brick, to be added to its plant at Chicago street and the Lehigh Valley Railroad.

The Hewitt Rubber Company, Buffalo, has completed plans and let contracts for an addition to its plant at Kensington avenue and the New York Central Railroad belt line, which will cost \$40,000. Considerable new equipment will be installed.

The Hoffman-Allen Company, Buffalo, has been incorporated with a capital stock of \$500,000 to manufacture rotary engines and pumps and arrangements for the establishment of a plant are in progress. The incorporators are William M. Hoffman, Buffalo, and Frank B. Allen and George R. Cooping, Tonawanda, N. Y.

The Clifton Mfg. Company, Buffalo, N. Y., maker of conduit, will install a steel runway crane at its plant at Sayre street and the New York Central Railroad.

The Royal Music Roll Company, Buffalo, Frank A. Halladay, manager, 2964 Main street, will erect a two story brick factory, 40 x 150 ft., at Main street and the Erie Railroad.

The Chas. Berrick's Sons Company, 103 Manitoba street, Buffalo, is building a factory, 50 x 120 ft., one story, of brick, at Manitoba street and the Erie Railroad.

The Crosby Company, Buffalo, Wm. H. Crosby, president, manufacturer of stamped metal specialties, automobile frames, etc., has started work on a further addition to be made to its plant on Pratt and Spring streets.

New England

BOSTON, MASS., June 11, 1912.

Business is improving in spite of the coming of the summer season with its customary dullness. The builders of machine tools just off the so-called standard lines, notably the grinding machines and the automatics and semi-automatics, find the demand strong, with prospects of a still brisker market a little later. The evidence is becoming still more convincing that politics will not be an essential factor in retarding the general improvement.

John Bath, recently head of the Bath Grinder Company, Fitchburg, Mass., has been made sales manager of the Reed-Prentice Company, Worcester, Mass.

The meeting of the American Iron, Steel & Heavy Hardware Association at Boston last week brought together representative business men from all over the country and the impression gained from contact with them affords an excellent barometer of business conditions. It was significant that the chief reason given for the non-appearance of members was that business is in such a prosperous condition that they could not afford to leave home. Those who were present, hardly without exception, made equally favorable reports. In many cases residents of the great farming sections of the Middle West spoke with utmost enthusiasm of the wonderful crops already being harvested and in prospect.

A new corporation known as the United States Envelope Sealing Company, Springfield, Mass., has purchased a mill site at North Amherst, Mass., and proposes to erect a factory on the premises. The main office is at 33 Lyman street, Springfield.

The development of water power in western Massachusetts is proceeding with great rapidity, thousands of horsepower being added each year. The latest announcement is that Springfield interests have secured options on large tracts of land along Miller's River with water power which should develop 20,000 h.p. These interests are affiliated with the Turners Falls Company, the president of which is Philip Cabot, of Boston. This company is completing the development of large additional powers and the Miller's Falls property will bring its present total up to 60,000 h.p. The advantage to towns and cities for many miles from these stations is tremendous and the results in the

manufacturing industries are already very important.

The Pratt-Read Company, Deep River, Conn., manufacturer of piano accessories, will erect a two-story brick addition.

The C. F. Church Mfg. Company, Holyoke, Mass., manufacturer of plumbing specialties and bath-room accessories, is planning the erection of a new factory. The present quarters have been outgrown. A manufacturing site has not been selected, and until that is accomplished the details of the building and its equipment cannot be decided upon. William J. Leonard is the president of the company, George W. Collins the treasurer, P. J. Murray the assistant treasurer and M. Belville the secretary.

The Quality Saw & Tool Works, Springfield, Mass., has begun the erection of a new factory which it expects to occupy by October 1. The company's product has been hack saw blades and mechanics' tools, to which have been added hack saw machines, frames, metal band saws, wood band saws, jewelers' saws, coping saws and circular saws.

E. F. Stenman, Worcester, Mass., has established a factory at 33 North Foster street for the manufacture of wire specialties of all kinds, including flat and round wire springs. The company has installed four-slide machines and some machine tools and is now building special machinery. Mr. Stenman was recently master mechanic for the Morgan Spring Company.

The Stanley Works, New Britain, Conn., manufacturer of builders' hardware, proposes to erect a large addition to the plant at Niles, Ohio, which will increase its capacity 50 per cent. The purpose is to provide for increased production of some lines of the heavier products. Most of the machinery for the addition will be shipped from the New Britain plant.

The Westfield Structural Company, Westfield, Mass., which is headed by W. J. Marshall, Holyoke, recently with the Walsh Boiler Company, of that city, proposes to establish a plant at Westfield.

The Simonds Mfg. Company, Fitchburg, Mass., will build an addition to its file works 52 x 120 ft., one story, to be used as a hardening room.

Philadelphia

PHILADELPHIA, PA., June 11, 1912.

While the market generally shows but a moderate movement, there is a larger volume of business in sight. The greater operative rate of industrial plants and the consequent increased use of machine tool equipment will, it is believed, lead to purchases of additional tools, which have been long delayed. At the same time prospects for the purchase of some extensive tool equipment are in sight and several propositions which have been before the trade are taking on a more encouraging appearance. In some few lines buying has been a trifle better, but it has hardly been sufficient to be felt by the trade in general. The movement in the heavier special equipment has been more active generally than that in the general standard metal working machine tools. Some builders of the former class of machinery are better engaged and are steadily increasing the productive rate. The railroads are still very light buyers of machine tool equipment. Machine tool merchants' sales continue irregular, being largely confined to single tools, although occasional purchases of small groups are noted. In the boiler, engine and power transmission lines some fair business is pending, the greater share being for equipment of the smaller powers. A moderate demand for second-hand machine tools and general machinery is noted, with inquiries covering the general line. Modern equipment in good order usually finds a ready market. Very little new movement in the export trade is reported.

Gray iron foundries are better engaged, while some of the steel casting plants are pretty well booked up for several months ahead and are no longer entering low-price contracts.

Proposals are being taken for the erection of a two-story, brick and reinforced concrete garage, 138 x 240 ft., to be built at the Southwest corner of Twenty-third and Walnut streets, for John Wanamaker.

The Pennsylvania Equipment Company is in the market for a second-hand steel building, about 80 x 200 ft., the minimum height at the eaves to be 35 ft. The building must be provided with crane runways and columns must be spaced on 20 ft. centers.

The Tipton Foundry & Machine Company, Top-

ton, Pa., is planning to add a brick foundry addition, 70 x 75 ft., which will materially increase its molding capacity.

The Lebanon Valley Iron & Steel Company, Lebanon, Pa., has placed a contract with Robert Wetherill & Co., Chester, Pa., for a Corliss engine and generator. It is planned to install an entire new electrical equipment, which will more than double the present capacity.

Among the items for which Herman Loeb, Director of the Department of Supplies, room 312, City Hall, Philadelphia, will take bids until June 17, is one for steam road rollers for use by the Bureau of Highways.

The Dawson Roller Grate Mfg. Company, Syracuse, N. Y., manufacturing roller grates, has been considering the selection of a site in Newark, Del., for the removal of its plant. Nothing of a definite nature has been decided upon.

Contractors are making proposals for the erection of a six-story, brick and concrete factory building for the England-Walton Company, Inc., at 322 Vine street. The plans are by D. K. Boyd, and call for a building 63 x 80 ft., equipped with two elevators, blowers, steam heat and electric light.

The Frick Company, Waynesboro, Pa., has added horizontal acting refrigerating machines to its line of ice making machinery, and report the receipt of considerable business for this new line. It is now arranging for another addition in the way of absorption refrigerating machinery and equipment, which it expects to place on the market during the coming year. Business so far this year is considerably ahead of that for the same period in 1911, although immediate orders are a shade lighter.

Karper Brothers, Fiftieth and Grays avenue, are taking bids for a concrete and steel coal pocket from private plans. Details are not available.

The bottle factory of the Whitney Glass Works, Glassboro, N. J., was badly damaged by fire on June 5. Details are not available, but it is understood that the work of rebuilding the burned factory will be begun at once.

The Merchant & Evans Company is contemplating a considerable addition of machinery and tools to its mechanical plant at 2025 Washington avenue. This will follow the removal of its tinplate dipping plant to Glenova, W. Va., which will take place some time in the early fall.

The John Wood Mfg. Company, Conshohocken, Pa., has developed a gas water heater line, consisting of a range boiler combination with a gas water heater, which it states is an important departure from that previously offered. It has adopted the welded and brazed construction exclusively for its complete line of tanks, ranging in capacity from 500 to 15,000 gal. While this plant is not fully engaged at the present time, the outlook for business is considered more favorable.

Chicago

CHICAGO, ILL., June 11, 1912.

The Atchison, Topeka & Santa Fé Railroad has added to its previous machine tool requirements and prices are now being asked on the following additional tools:

- One 10 ft. bending rolls for 3/4-in. plate, motor drive.
- One 24-in. x 10 ft. engine lathe, belt drive.
- One 2-in. single-head bolt cutter.
- One 42-in. car wheel lathe.
- One high-speed friction saw, motor drive.
- One 26-in. traveling head shaper, belt drive.
- One 75-lb. power hammer.

Orders were placed by Fairbanks, Morse & Co. for the machines for which they have been inquiring, among which were a 42-in. crankshaft lathe, a 6-ft. radial drill, a No. 4 miller and two boring mills, the purchases aggregating about \$12,000. Miscellaneous buying continues active and the number of manufacturing plants for which increased capacity is being planned gives promise of a well-sustained trade throughout the summer.

The Stover Engine Works, Freeport, Ill., is contemplating the expenditure of \$60,000 for the building of additional warehouse capacity.

The Cotta Gear Mfg. Company, Rockford, Ill., has been incorporated with a capital stock of \$100,000 for the manufacture and sale of automobile parts and like

machinery. The incorporators are P. A. Peterson, Lebin Faust, Charles E. Cotta and F. L. Lindgren.

The Cyclone Fence Company, Waukegan, Ill., in consideration of the vacation of certain streets by the city, has agreed to erect a factory building to cost \$150,000 and to be ready for occupancy within the next three years.

The Davenport Locomotive Works has closed a contract with the Western Implement & Motor Company, Davenport, Iowa, for the manufacture of the Appleby cotton picker and one of the company's buildings is being equipped with machinery for this purpose.

The Hamilton Foundry & Machinery Company, Hampton, Iowa, is engaged in the erection of a new plant.

The Waterloo Cabinet Company, Waterloo, Iowa, has been organized with a capital stock of \$25,000 by Joseph Scheitler and L. F. von Schuch, to engage in the manufacture of vacuum sweepers, cabinets and other novelties.

The Herring Motor Car Company, Des Moines, Iowa, has purchased a site on Tenth street, upon which a three-story reinforced concrete building to be used for office, garage and shop purposes will be erected.

Kibby Bros., Perry, Iowa, manufacturers of washing machines will build a three-story concrete factory containing 11,000 sq. ft. of floor space and to be ready for occupancy by early fall.

The Minneapolis Heat Regulator Company, Minneapolis, Minn., has taken out a permit for the building of a reinforced concrete factory on Fourth avenue South, to cost \$10,000.

The Northwest Thresher Company, Stillwater, Minn., is building an addition to its foundry sufficient to double the capacity of that department.

The Hamilton Beach Mfg. Company, Racine, Wis., is seeking a site upon which to erect a factory building to be 65 x 100 ft., four stories, of brick and steel construction.

The Rothbert Steel & Iron Company has been incorporated with a capital stock of \$5,000,000 to build a plant at Pueblo or Denver, Colo., by D. E. Rowe, H. L. Hamilton and R. H. Tatelow, Jr.

The Telluride Iron Works, Telluride, Colo., E. H. Sackett, manager, is remodeling its foundry and machine shop and improving the equipment.

Detroit

DETROIT, MICH., June 11, 1912.

Machine tool merchants report a somewhat better volume of orders, confined, however, mostly to single tools. Inquiries likewise have increased somewhat, but are not notable for size. Shop supplies are in active demand and there is some betterment in the call for special equipment. The second-hand machinery market shows fair activity in metal-working tools, but wood-working equipment is rather dull. The foundry trade shows little change, a short walk-out among the iron molders caused temporary embarrassment, but at this writing all of the molders have returned to work. Boilers and engines are in fair demand.

The Grant Automatic Machine Company, Detroit, has been incorporated with \$50,000 capital stock to manufacture and deal in machinery. It is understood that the company controls valuable patents covering tool rest adjustments and an improved type of lathe. The incorporators are Robert H. Grant, Ann Arbor, Mich., and Alfred C. Verth and Harold W. Holmes, of Pontiac.

A new company which promises to be of considerable importance is the General Aluminum & Brass Castings Company, Detroit, incorporated with a capital stock of \$75,000 by Frank C. Root, formerly of the Aluminum Castings Company, and others. The company has secured a site of about three acres at St. Aubin avenue and the East Boulevard and will erect a steel and concrete foundry building 161 x 117 ft. and one story.

The C. R. Wilson Body Company, Detroit, is erecting a five-story addition of brick and mill construction adjoining its present plant, to be used as a body manufacturing plant, assembly floor and paint shop. Presses, drop hammers and body-making machinery will be installed. Smith, Hinchman & Grylls prepared the plans.

The Allyn Engineering Company, Cincinnati, has

removed its Detroit offices from the Ford Building to 810 Union Trust Building. The office will be in charge of Charles C. Moody, with Charles A. Belanger as district engineer. The company has been appointed architect for a 10-story hotel to be erected at Adams avenue and Witherell street. The latter plant will cost approximately \$25,000, and bids will soon be asked for.

The A. D. W. Automatic Shoe Cleaner Company, Detroit, has been incorporated with \$50,000 capital stock to manufacture a patented shoe polishing machine. The incorporators are A. D. Washington, John Holly and Burgess Estes.

The Desmond Charcoal & Chemical Company, Detroit, has been incorporated with \$100,000 capital stock by Thomas Berry, Edward Pendleton and Frederick S. Colby. It is understood that the new company will take over and operate the plant of the Desmond Chemical Company at Traverse City, Mich.

The Michigan Central Railroad has taken out a permit covering the erection of a one-story car shop on Livernois avenue to cost \$20,000. The new structure will be 107 x 497 ft.

The Schwartz Foundry Company, Detroit, will erect a foundry building on Fort near Twelfth street to cost about \$7,000. The new building will be 107 x 133 ft., one story, and of brick construction.

The Detroit Insulated Wire Company, Detroit, has had plans prepared for a reinforced concrete factory building 60 x 190 ft. and an office building 40 x 54 ft. at Albert and Wesson avenues. The plant will be two stories with a basement.

The Michigan Pattern Works, Detroit, will erect a new plant on Jefferson avenue. The building will be 50 x 126 ft. and one story, of brick construction.

The Detroit Lubricator Company, Detroit, is establishing a branch plant at Windsor, across the river from this city, and has secured factory quarters in the Villans Mill Building. It is understood that the company will probably erect a factory of its own in the near future. An excellent volume of business is reported.

Fire which entailed a loss of \$20,000 destroyed the plant of the Van Blerck Motor Company, builder of marine motors, June 7. Owen Rippey, general manager, states that the plant formerly occupied by the Gray Motor Company, at Lieb and Larned streets, has been secured and that manufacturing operations will be resumed at an early date.

The Colonial Electric Car Company, Detroit, has increased its capital stock from \$10,000 to \$20,000.

The entire plant of the Lion Motor Company, automobile manufacturer, Adrian, Mich., was destroyed by fire June 2, the value of the buildings and machinery destroyed being estimated at \$150,000. The company will take immediate steps to rebuild, but according to Vice-president Fred Postal it is yet undecided whether the business will be continued in Adrian or removed to Detroit.

An estimated loss of \$150,000 was caused by a fire which destroyed the plant of the Wilson Saw & Mfg. Company, Port Huron, Mich., last week. It is stated that the plant will be rebuilt and the entire mechanical equipment will have to be replaced. F. G. Cowan is general manager of the company.

The Grand Rapids Metal Furniture Company, Grand Rapids, Mich., has taken out a permit for the erection of a factory building to cost \$12,000.

Plans are being prepared for the rebuilding of the State School for the Deaf, Flint, Mich., which was recently destroyed by fire. The new buildings will cost about \$100,000 and a heating plant and other equipment will be installed.

At a special election, held June 4, the taxpayers of Stockbridge, Mich., voted in favor of bonding for \$20,000 for the erection of a new waterworks plant.

The Water Commissioners of Pontiac, Mich., are considering the erection of a new pumping station and the installation of additional pumps.

The Dowagiac Stove Works, Dowagiac, Mich., will erect an entirely new plant this summer. The new structure will be 126 x 250 ft., two stories. The machinery from the old plant will be moved into the new one, but some additional equipment will probably be required.

The Clough & Warren Piano Company, Adrian, Mich., which has been in the hands of receivers, has been reorganized with a capital stock of \$200,000 by J. A. Warren, Eugene Holmes and others. The new company will continue to operate the present factory.

Cleveland

CLEVELAND, OHIO, June 11, 1912.

Business with local machinery dealers is dull. The demand so far this month has been less active than May. Sales the past week were almost entirely single tools. Some fairly good orders for plant extensions that are in prospect are still being held up. Conditions are generally more satisfactory with local builders of machine tools than with dealers. While the improvement is not general the makers of all classes of machinery and some local builders note considerable improvement in orders. A builder of turret lathes reports a good volume of foreign business which is 100 per cent. better than at this time a year ago and a more active domestic demand. Orders for bolt machinery have improved considerably. There is good inquiry for water wheels, mining machinery and handling equipment. Some new business in steel plant equipment is in prospect. Makers of some lines of special machinery report a good volume of orders. The demand for small motors is quite active. Some of the local machine tool builders have increased their working forces during the last week or two and are having trouble securing good machinists. There is an abundance of second-hand machinery on the market. This is moving slowly.

The Thatcher-Rueter Mfg. Company, maker of steel stampings, dies and tools, has just moved from its former plant at 112 Hamilton avenue to a new location at 826-30 Champlain avenue, Cleveland. The new quarters give the company double its former capacity. To provide for its growth the company has increased its capital stock from \$20,000 to \$30,000. S. W. McKillop, formerly with the Michigan Pressed Steel Company, Detroit, Mich., has become associated with the company and is now its manager. To its present line of products agricultural stampings will be added. The company is in the market for some new machinery equipment including three heavy presses, snitting shears and power circle shears.

The Park Motor Car Company, which has been conducting a garage at 10217 Superior avenue, Cleveland, has changed its name to the Park Motor & Mfg. Company and will engage in the manufacture of machine screw products, automobile accessories and will do tool and die work. This company has bought out the D. & O. Machine Company which has been making machine screw products, its plant being located in the Perkins Building. The new company will install some new machinery. D. R. Sackman is the manager.

The Draper Mfg. Company, Cleveland, Ohio, now located on Ashland avenue, S. E., is building a new plant on East Eighty-second street, adjoining the Erie and Pennsylvania railroad tracks. The new building will be 75 x 180 ft., one story, of brick construction. The company expects to move to its new quarters in August. Its products are steel barrels.

The Buckeye Brass & Mfg. Company, Cleveland, has been incorporated with a capital stock of \$20,000 to manufacture plumbers' brass goods and specialties. The incorporators are David M. Strauss, Henry Selker, George J. Almendinger, B. J. Sawyer and Albert Sterns. The company will locate in a plant at 1807 Columbus Road and will succeed the Buckeye Brass & Pattern Company which has been in business at the same site as a partnership.

The Hobart Electric Mfg. Company, Toledo, Ohio, has been formed with a capital stock of \$20,000, the incorporators being A. T. Raynor, W. F. Runkle, Henry Hoppenburg and others.

The Hardy Paint & Varnish Company, Toledo, Ohio, is making plans for the erection of a larger plant to provide increased facilities for the manufacture of its products. The company has asked for authority to increase its capital stock from \$75,000 to \$300,000.

A new plant for the manufacture of fireproof building material will be built in Norwalk, Ohio, by N. T. Sharp, of Bridgeport, Ohio. The Norwalk Chamber of Commerce has accepted the proposition for the location of that plant in that city.

The Swinehart Tire & Rubber Company, Akron, Ohio, is making preparations for the building of a large plant which will triple its present capacity. The company has secured an option on a 12-acre site on which it proposes to build. The new plant will be equipped entirely with new machinery.

F. M. Froelich, consulting engineer, Toledo, Ohio, has prepared plans for a municipal lighting plant for Kendalville, Ind. Plans provide for an outlay of

about \$100,000 for equipment including three 150-kw. generators, one 300-kw. generator, one 1300-kw. generator, 2225-hp. compound condensed steam engine, switchboard and other equipment.

The J. J. Duck Company, Toledo, Ohio, has been incorporated with a capital stock of \$20,000 to engage in the electrical construction and supply business. John J. Duck, C. A. McNeil and others are incorporators.

The Jacobson Iron Company, Toledo, Ohio, has been incorporated with a capital stock of \$10,000 by Michael Jacobson, John B. Crouch, Thomas C. Farrell and others.

The Perfection Silo Mfg. Company, Massillon, Ohio, has placed a new plant in operation for the manufacture of sheet metal silos.

The J. G. Russell Company, Dayton, Ohio, has secured a contract to build an electric lighting plant at Graham, W. Va.

The village of Minster, Ohio will vote July 9 on the question of a \$20,000 bond issue for extending its water works system.

The Frankfort Water Company, Frankfort, Ky., has had plans prepared for a new filtration plant, bids for which will be received shortly.

The Cleveland Railway Company, Cleveland, Ohio, is planning the expenditure of \$97,000 for new motors for cars.

Cincinnati

CINCINNATI, OHIO, June 11, 1912.

The machine tool business is rather quiet. The export demand has fallen off, but it is reported that the railroads are doing some quiet buying, following the same policy adopted by them some time ago. While the inquiry from the domestic trade is fairly good, buyers are slow in placing orders.

There is quite a let-up in the boiler and tank business. June is generally a good month, but manufacturers attribute the present dullness to weather conditions that have retarded building operations all over the country.

Second-hand machinery dealers, as a rule, report business rather spotty, but state business from the South is showing some improvement.

The Ohio Timelock Company, Cincinnati, has been incorporated with \$50,000 capital stock, to take over the business of the company of the same name, heretofore operated under a partnership arrangement. No additions to the company's present plant are contemplated just now.

The Wilborne Oil Company, Covington, Ky., has let the contract for additions to its power plant, recently mentioned, to J. J. Craig, a Covington contractor.

The Structural Concrete Company, Dayton, Ohio, has a contract for the erection of a large carbarn for the Oakwood Street Railway Company, for which considerable structural material will be required.

The Allyn Engineering Company, Second National Bank Building, Cincinnati, is preparing plans for two buildings to be erected by the Standard Brass Works, Detroit, Mich. The main structure will be 60 x 155 ft. two stories and basement, and of regular mill construction. A one-story foundry building 60 x 100 ft., of brick and steel, will also be erected.

The Foos Gas Engine Company, Springfield, Ohio, is erecting a large addition to its plant.

The Portsmouth Engine Company, Portsmouth, Ohio, has been incorporated with a capital stock of \$30,000. It will do a foundry and machine shop business.

The Noyes Mfg. Company, Dayton, Ohio, manufacturer of vending machines, has let contract for a power plant to the Allyn Engineering Company, Cincinnati.

The Automatic Tile Machine Company, Cincinnati, has been incorporated with \$10,000 capital stock by A. W. Koch, Cincinnati, W. K. Achert, Norwood, Ohio, and others. The company has not completed its manufacturing plans and is not yet in the market for any equipment, as has been currently reported.

W. N. Cox, clerk, Board of Education, Mason, Ohio, will open bids July 8 for the necessary heating and ventilating equipment for a proposed school building at that point. Plans are on file in the office of C. C. & E. A. Weber, architects, Mercantile Library Building.

It is rumored that the Barney & Smith Car Company, Dayton, Ohio, is making arrangements to build

all-steel cars on a more extensive scale, and that it will soon be in the market for a quantity of machine tools.

The Lima Locomotive & Machine Company, Lima, Ohio, is reported to have plans under way for extensive additions to its plant at that point.

Indianapolis

INDIANAPOLIS, IND., June 11, 1912.

Extensive additions are to be made to the plant of the Nordyke & Marmon Company, this city, manufacturer of automobiles and flour milling machinery. Two stories, 52 x 243 ft., are being added to building G. A new office building, two stories, 43 x 155, will be built, the second to be the enlarged drafting rooms. The capacity of the plant will be enlarged by these additions and considerable new machinery will be installed.

The Henderson Motor Car Company, Indianapolis, has leased the factory buildings of the National Casket Company at North West and Fourteenth streets, the latter company to transfer its business to its plant at Chicago and Louisville. The main building is of four stories, 106 x 212 ft.

The Eastern Moline Plow Company, Bloomington, Ill., is seeking a site for a three story warehouse about 50 x 125 ft., in Indianapolis, with prospects that a factory will be established also.

The Union Traction Company, of Indiana, with headquarters at Anderson, has ordered from the Cincinnati Car Company 10 steel interurban passenger cars, the first of the kind to be placed in service in the State.

The Zeno Mfg. Company, Indianapolis, has been incorporated with \$5,000 capital stock, to manufacture bathroom furniture. The directors are S. F. Daily, J. M. Daily and Z. W. Whitney.

The Dugger Electric Light & Power Company, Dugger, Ind., has been incorporated as a public service corporation, with \$12,000 capital stock. The directors are W. D. Hodson, W. T. McCaskey and S. F. Seagar, all of Lansing, Mich.

The A. L. Greenberg Iron Company, Terre Haute, Ind., has increased its capital stock from \$40,000 to \$100,000. Jacob R. Finkelstein is president.

The Wildwood Builders Company, Ft. Wayne, Ind., has increased its capital stock from \$100,000 to \$150,000.

The Remy Electric Company, Anderson, Ind., will enlarge its plant on account of increased demand for its product. The annual output now will be 130,000 magnetos. The company will increase its number of employees from 600 probably to 1000.

The Lundberg Contracting & Building Company, Indiana Harbor, Ind., has been incorporated with \$10,000 capital stock, to do a general construction business. The directors are M. B. Lundberg, W. N. Walton and C. B. Sheets.

The Marion Heat & Light Company, Marion, Ind., and the Jonesboro Lighting Company, Jonesboro, Ind., have amended their articles of incorporation so as to enable them to supply water, light, heat and power instead of light only as in case of one of them and of light and heat by the other.

The Central Indiana Gas Company, Muncie, Ind., which has added to its recent purchases in the old natural gas belt of Indiana the plants at Anderson, Greenfield and Elwood will connect all by a web of pipe lines. J. H. Maxon, Muncie, is manager of the company. This and other companies allied with it are controlled by the Metropolitan Gas & Electric Company and the Union Gas & Electric Company. Rufus C. Dawes, of Chicago, being president of both of these companies.

The Schreiber Mfg. Company, Hammond, Ind., has filed notice of a change of name to the American Potato Machinery Company.

The Orr Iron Company, Evansville, Ind., is preparing plans for the erection of reinforced concrete and steel construction warehouses, the cost of which is estimated at \$100,000.

The Bass Foundry & Machine Company, Fort Wayne, Ind., is about to erect a new boiler shop, 110 x 300 ft., to be of steel construction with a center bay carrying a 30-ton electric crane.

The Muncie Gear Works, Muncie, Ind., has begun the construction of a new factory building of concrete blocks and steel. It is designed to be modern in every detail and will be equipped with a quantity of new machinery, including gear cutting machines. The company manufactures differential gears, levers, jack shafts and sprockets for automobiles.

St. Louis

ST. LOUIS, Mo., June 10, 1912.

The machine tool market continues in the even tenor of its way, with no especially remarkable features to record. No new lists of importance came out during the week, but the demand for single replacement and extension of equipment machinery continues reasonably satisfactory. Politics, apparently, is having very little effect on existing operations in this section, though it may be possible that such considerations are checking new enterprises to some extent. Collections remain fairly satisfactory.

The Ford Motor Company, Detroit, Mich., has bought a half block of land, 150 x 345 ft., immediately opposite the plant of the Dorris Motor Car Company, St. Louis, and will expend \$200,000 on an assembling plant from which to supply its trade in this section. Automobiles will be shipped knocked down from the main plant, about 5000 per year. The new plant will be ready about November 1.

The George W. Johnston Company, Kansas City, maker of steel and iron fire escapes and fireproof doors, has acquired and equipped a factory in St. Louis and completed its removal to this city.

The Ozark Power & Water Company, with headquarters at Joplin, Mo., has made formal request of the Government for permission to dam the White River in Taney County, Missouri, for a hydro-electric plant.

The Show-Me State Mining Company, Web City, Mo., has been incorporated by A. McInturff, E. C. Dunmeyer and C. W. Hoooven to develop and equip mining property owned by them. Capital, \$50,000.

The Kansas Central Traction Company has applied to the Utilities Commission of Kansas for permission to construct and operate an electric line, with power houses, from Parsons to Coffeyville.

The Automatic Starter Company, St. Louis, has been incorporated with \$50,000 capital stock to manufacture and distribute an automatic automobile starter invented by John J. Cochran, St. Louis, president of the Camden Lumber Company. A factory will be built in St. Louis.

The Green Hills Creamery Company, Willow Springs, Mo., with \$10,000 capital stock, incorporated by D. C. Preston, J. D. Pope, C. A. Harnden, J. D. McDowell and N. P. Jacobson, will construct and equip a separating plant at Willow Springs.

The Steel Roof Truss Company, St. Louis, has increased its capital stock from \$25,000 to \$50,000 for the purpose of enlarging its plant.

The American Mfg. Company, St. Louis, has bought ground for the immediate enlargement of its bag manufacturing plant.

The F. A. Wagenfuhr Book Binding Company, St. Louis, has been incorporated with \$40,000 capital stock to equip and operate a bookbinding plant. The incorporators are F. A. Wagenfuhr and Hans Wagenfuhr and others.

The Aluminum Mfg. Company, Kansas City, Mo., has been incorporated with \$10,000 capital stock by Guy M. Pabst, Rudolph Best and others to equip a plant for the manufacture of aluminum utensils.

The Brandsville Canning & Preserving Company, Brandsville, Mo., with \$35,000 capital stock, has been organized by T. W. Wade, J. H. Curran and F. J. Stuart to equip a large canning and fruit preserving plant.

The Carrey Process Company, St. Louis, has been incorporated with \$20,000 capital stock by John O. Carrey, A. J. Robus and H. B. Morse, of St. Louis, to equip a plant for the manufacture of patented devices for use in the manufacture of gas.

The Watson Mining Company, Joplin, Mo., has been organized with \$65,000 capital stock by S. Watson, W. S. Watson and J. R. Nowlin to equip and operate mining property owned by the incorporators.

The East St. Louis Bridge Company has been incorporated with \$125,000 capital stock by Edwin A. Curtis, George B. Curtis and Robert P. Munger for the manufacture of patented bridges.

The Ralston Purina Company, St. Louis, has purchased a site and will erect at once a \$500,000 milling and manufacturing plant in East St. Louis, to be in addition to the large plant operated by the company in St. Louis.

The American Farm Gate Company of Arizona, with \$200,000 capital stock, has been authorized to utilize \$20,000 of its capital in a plant to be constructed at Kansas City, Mo.

The England Ice & Gin Company, England, Ark.,

has been incorporated to construct an ice and cotton ginning plant. G. W. Morris is president of the company.

The Inland Cotton Company, Durant, Okla., is reported to have completed plans for the doubling of its mechanical plant at a cost of about \$5,000.

The Muskogee Cotton Compress Company, Muskogee, Okla., has been incorporated with \$50,000 capital stock by R. T. Harris, R. J. Williams and F. E. Anderson, of Oklahoma City, to equip a compressing plant.

A ginning plant to cost about \$10,000 is to be constructed at Sallisaw, Okla., by McDonald & Matthews.

Argenta, Ark., through its board of public affairs, has contracted for an extension of its electric light and power plant, the equipment to include a 500-hp. engine, two 175-hp. boilers and other equipment. Theodore Sanders, architect, of Little Rock, is in charge.

A municipal electric light and power plant is under consideration by the town of Ashdown, Ark. The mayor and Municipal Board have charge of the matter.

The Ozark Feed Company, Neosho, Mo., has been formed with \$10,000 capital stock by J. A. Linney, R. E. Linney and A. L. Brannock to equip a feed and flouring mill.

The Indianola Refining Company, Okmulgee, Okla., has been incorporated with \$150,000 capital stock by E. E. School and Charles E. Martin, of Okmulgee, and C. D. Martin, of St. Louis, to equip an oil refining plant.

A factory for the manufacture of automobiles, motor trucks, etc., is to be built and equipped at a total cost of \$50,000 at Oklahoma City, Okla., by W. E. Nation.

A hydroelectric plant, with an investment of about \$350,000, is to be built by the North Arkansas Power Company on King's River, Ark., with about 1400 hp. capacity. I. R. Packard is the engineer in charge and the company location is at present at Berryville, Ark.

The Mississippi River Commission, 317 Liggett Building, St. Louis, Mo., is receiving bids for the erection of a shop building, 70 x 160 ft., with truss roof and fabricated structure steel framing. Specifications can be had from the secretary.

The Central South

LOUISVILLE, Ky., June 11, 1912.

Although industrial activity is usually required to produce similar conditions in the machinery business, there will be a good deal of trade forthcoming in the near future on account of the midsummer dullness which makes its appearance in many lines. Manufacturers who in the busy season would not consider making extensive changes which would interfere with production will take advantage of the lull during the next two or three months to carry out plans for improvements which have been hanging fire for some time. Several instances of this kind have been noted lately, and suggest that the machinery trade ought to be considerably stimulated on this account. Right now the situation is fairly quiet, a scattering volume of small business holding this up, however.

The Henry Vogt Machine Company, Louisville, is receiving bids on a 300-kw. addition to its power plant. A generator direct connected to a Corliss engine will be installed. The present plant will be continued, but was found inadequate for the demands on it during the past season.

The Louisville Cooperage Company will begin work on an addition to its plant next month. Motor-driven woodworking machinery will be installed. Nicholas White is president of the company.

The Falls City Construction Company, of Louisville, has definitely arranged to build a \$600,000 hotel in Savannah, Ga. It will design and erect the structure itself. The mechanical equipment will be extensive. The building will probably be of reinforced concrete.

The J. F. Hillerich & Sons Company, Louisville, baseball bat manufacturer, has acquired the plant of the Pontiac Turning Company, Pontiac, Mich., and will continue the business here. Some extensions of the local factory are contemplated. J. A. Hillerich is president of the company.

The National Cannery Association will have its annual convention in Louisville next February. A machinery exhibition will be held in connection with it at the First Regiment Armory.

The Louisville Board of Education is receiving bids on the installation of a boiler and heating plant in the California school, Seventeenth and Kentucky streets; new boilers at the Madison street school, and a boiler and heating apparatus at the Washington

school. Sam D. Jones is business director of the board.

R. O. Rubel, Jr., & Co., Louisville aeroplane manufacturers, have assigned. The company will be reorganized and the plant continued in operation. It occupies a building in South Louisville formerly used by the Alvey-Ferguson Company, which removed to Cincinnati last fall.

It is reported that the General Motors Company is considering the establishment of an automobile factory in Louisville. Representatives of the company have been looking over the situation here.

Adolph Dietz & Co. have the contract for the erection of the reinforced concrete warehouse of the Farmers' Loose Leaf Tobacco Warehouse Company of Mt. Sterling, Ky. The building will cost \$25,000.

Definite announcement has been made that the Cincinnati Locomotive & Car Company, Cincinnati, Ohio, has acquired property in Covington, Ky., and will remove its plant to that city, which is just across the Ohio River from Cincinnati. The company builds locomotives and contractors' equipment. John E. Glenn is president.

C. J. Walton & Son, Louisville, have installed a 90-hp. boiler in the plant of the O. K. Laundry, Louisville.

The Turner, Day & Woolworth Handle Company, Louisville, is preparing to build a factory at London, Ky., for the manufacture of hickory handles.

The handle factory of Tinsley & Quiggins, Kuttawa, Ky., was burned June 2 with \$5,000 loss. The owners are now considering plans for rebuilding.

The Tri-Fork Collieries Company, Frankfort, Ky., has been incorporated with \$500,000 capital stock for the purpose of operating oil and gas properties in eastern Kentucky. The incorporators are Lemuel C. Artemus, John H. Dingee and Duncan C. Anderson, all of Philadelphia.

The Brent Hart Mining Company, Mannington, Ky., is planning the installation of a new power plant, as well as an air compressor, shaker screens, hoisting engine and fan system. Two new boilers will be purchased as part of the equipment. Brent Hart is president and general manager of the company, the daily output of which will be increased 500 tons a day.

The Kentucky Public Service Company, Bowling Green, Ky., has announced that 5½ miles of gas mains will be laid this season. The mains will range in size from 4 to 10 in.

The Ernest Daughtry Plumbing Company, Bowling Green, Ky., has the contract for the installation of a steam heating plant in the St. James apartment house, now in course of construction.

The Hickman Ice & Coal Company, Hickman, Ky., has completed the installation of an engine and generator.

The Kentucky Stave & Tie Company, Harlan, Ky., is planning the construction of mills for the development of a large timber tract. W. L. Taylor is general manager.

C. R. Payne, Burkesville, Ky., is in planning the installation of a small lighting plant. A crude oil engine of 40 hp. capacity will probably be used.

The Nashville Gas & Heating Company, Nashville, Tenn., has formally taken over the plant and other property of the Nashville Gas Company, and has issued bonds of \$6,000,000, \$2,000,000 of which will be sold to provide for extensive improvements in the plant. The new company recently secured a franchise from the city.

Dayton, Tenn., is constructing a water-works system. Work on the pumping station will begin shortly.

The Kennedy Ice Company, Monteagle, Tenn., is installing an electric light plant to be operated with power from the factory.

Frank W. Milbourne has been elected general manager of the Southern Engine & Boiler Works to succeed D. H. McDonald, and Hugh M. Harris has become superintendent.

The John P. Dale Machinery Company, Nashville, Tenn., has delivered an Erie City boiler to the North Nashville Roller Mills, and has installed another of the same make at Ruskin Cave College, Ruskin, Tenn. The company reports the outlook for sawmill machinery to be improved.

Livingston, Tenn., is considering the establishment of a gas plant. Citizens are preparing to form a company to operate the proposed system.

The J. C. Bilbrely Spoke Company, Livingston, Tenn., will erect a mill at Carthage, Tenn. It will be in charge of Roscoe McGinnis.

J. J. Morrow, manager of the Prendergast Lumber

Company, Prendergast, Tenn., has announced plans for the erection of a cotton mill in that city. A company with \$100,000 capital stock is being organized for the purpose of erecting a plant.

The Ford Flour Company, Nashville, Tenn., has purchased a site for an addition and will begin work on the building at once. The cost of the structure and the machinery to be installed will total \$40,000.

Coal Creek, Tenn., may install a water plant. G. W. Wendling is chairman of the water committee of the City Council.

The Tennessee Implement Mfg. Company has been incorporated at Springfield, Tenn., with \$10,000 capital stock by D. F. Williams, H. T. Annis, T. M. Woodard and others. Farm rollers will be the principal output of the plant.

Hagan & Fletcher, Nashville, Tenn., are planning the construction of a phosphate mill and the manufacture of fertilizer.

The Louisiana Forest Products Company, Bogalusa, La., is planning the erection of several plants for the production of turpentine from wood waste. The company will spend \$250,000 in the construction of the plants.

Arthur Platt, Athens, Tenn., will build a clay-working plant, with drain tile as the principal product.

The Decherd Mill Company, Decherd, Tenn., will install a small lighting plant, which will be operated with natural gas. An engine consuming that character of fuel will therefore be purchased. C. E. Murray is in charge of the construction of the plant.

Birmingham

BIRMINGHAM, ALA., June 10, 1912.

There continues to be a substantial demand for machinery and supplies in Alabama and adjoining states, especially in the lumber territory, where activity of sawmills is on the increase owing to rise in price and improvement in call for the output. Good weather has also had its influence, all physical operations having become unhampered owing to the dry and warm season. Special inquiries as a rule are for boilers and engines. May business was very satisfactory and the June outlook is good, in fact, better than usual. The general promise seems to be of more than customary summer activity in preparation for a still more active fall and winter. Politics is cutting no figure in business this year.

The Griffin Buggy Company, Griffin, Ga., has been incorporated with a capital stock of \$50,000 by John H. Ward and others.

The acid plant of the American Agricultural Chemical Company at Montgomery, Ala., was burned. It is generally understood that it will be rebuilt. The fire loss was \$75,000 to \$100,000.

It is reported at Orlando, Fla., that W. W. Wright and others will build a grain elevator.

It is reported at Headland, Ala., that the Homer Fertilizer & Oil Company will build a fertilizer factory.

T. R. Morgan and others, who leased the plant of the Opelika Oil & Fertilizer Company at Opelika, Ala., will, it is reported, improve and enlarge it.

Cartersville, Ga., has voted a bond issue of \$8,000 for extension of gas plant.

The Empire Cotton Oil Company, Atlanta, Ga., will establish a cotton seed oil mill at Madison, to cost \$100,000.

DeLand, Fla., contemplates a new packing plant at a cost of \$7,000. A. S. Hall, Florida Citrus Exchange, Jacksonville, Fla., is in charge.

The Athens Pottery Company, Athens, Ga., will increase the capacity of its plant.

The Sarasota Citrus Exchange, Citrus, Fla., will erect a packing plant.

The mayor of Daytona, Fla., has been instructed to draw up an ordinance calling for \$100,000 of bonds for a sewer system, etc.

The Decatur Water Works Company, Decatur, Ala., has placed \$300,000 of bonds with a New York firm, the proceeds to be used in improving and extending the system.

Application has been made for the incorporation of the Punctureless Tire, Chipley, Fla., Company, with a capital stock of \$12,500. L. W. Crow and others are interested. The purpose is to manufacture automobile tires.

It is announced in Atlanta, Ga., that the Deere Plow Company, Moline, Ill., will establish a \$500,000 factory for the manufacture of wagons and vehicles.

It is reported at Stewart, Ala., that the St. Clair

Land & Lumber Company will establish a saw mill and dry kilns.

The Lehman Mfg. Company, Anniston, Ala., which has been tied up by bankruptcy proceedings, will resume operations, it is announced, and will manufacture lawn-swings, step ladders and washboards. J. S. Lehman, Lancaster, Pa., is to be manager of the concern.

Texas

AUSTIN, TEXAS, June 8, 1912.

Good rains over a large portion of the agricultural part of Texas as well as in the grazing territory since the first of the month have added to the bright prospects of business generally. The outlook for an extraordinary yield of crops could hardly be better. The machinery trade continues in a very satisfactory condition. This applies to the demand for small tools as well as for large machinery equipment. An improvement in the situation in Mexico is noted and it is thought that the time is not far distant when tranquility in that country will be restored and the American machinery trade assume its normal status.

The Candelilla Wax Company is installing a plant near Sierra Blanca, for the refining of wax made from the candelilla plant.

The City Commission of Houston has called an election of taxpayers, to be held July 9, to vote on the proposition of issuing \$2,650,000 of bonds for general public improvements. In dividing up the amounts for various purposes the calls for the issues provide as follows: Drainage, \$750,000; sanitary sewers, \$500,000; high schools, \$500,000; bridges, \$200,000; paving, \$300,000; parks, \$250,000; city hall annex, \$150,000.

The City Commission of Houston has authorized the mayor to advertise for bids for the construction of a reinforced concrete bridge over Buffalo Bayou at San Jacinto street. The plans and specifications for the structure which have been adopted call for a bridge that will cost not to exceed \$165,000.

The Freeport Mexican Fuel Company has acquired extensive oil land holdings in the Tampico district of Mexico, and is preparing to become a large producer of crude oil, which will be concentrated at Freeport.

The city will make improvements to the municipal waterworks plant at Cleburne, at a cost of about \$55,000. Five miles of new main will be laid.

The City Council of Coleman has taken steps towards installing an electric light and power plant there.

The Pampa Grain & Elevator Company is erecting a grain elevator at Pampa.

At a recent election of taxpayers of Calvert, \$25,000 of bonds for the construction of a sewer system were voted.

The contract for the construction of the first unit of a large irrigation canal system by J. J. Conway and associates, at Mission, has been awarded to Smith & Whiting. A large amount of pumping machinery will be installed and the capacity of the first unit will be sufficient to irrigate 8000 acres of land.

The Carr Furnace Company, Wheeling, W. Va., is investigating the situation at El Paso, Texas, with a view of establishing a plant for making furnaces.

The Robstown Gin Company, Robstown, has been organized with a capital stock of \$24,000. The incorporators are V. V. Elick, C. C. Brendle, W. T. Thompson and W. T. Thompson, Jr.

The Brown-Atchison Oil Company is preparing to engage in oil operations in the Humble oil field. The incorporators are P. M. Merchant, I. W. Sparks and G. E. Kelly.

Gerhard Zoch is installing a cotton gin and lumber mill at Northrup.

J. M. Wilson and H. C. Ruth will install a plant at San Antonio for the manufacture of boilers, steel tanks, smokestacks and plate steel work of all kinds. The new building will be 60 x 100 ft., and will be constructed to carry a 5-ton traveling crane.

Alexander Boynton will install a large pumping plant at Espantoso Lake, near Crystal City, and construct a canal system to irrigate a large tract of land. He will also build a concrete dam across the outlet of the lake for the purpose of raising the water level about 15 ft.

S. R. Howe and associates have applied to Fort Worth for a franchise to lay a system of crude oil pipe lines through certain parts of town. It is their purpose to supply manufacturing industries, business houses and private consumers with the oil for fuel.

The Cooperative Canning Company has received the machinery and other equipment for its proposed canning factory that is to be installed at Douglas, Ariz. The plant will cost about \$35,000.

An electric power plant will be installed at the state agricultural college at Las Cruces, N. M., for the purpose of providing power for operating the irrigation pumps upon the farm of the institution.

The Wheeler Gin Company which has been organized at Wheeler, Texas, will install a cotton gin. The incorporators are D. E. Holt, W. C. Stamper, W. L. Rippey and others.

The Northwest Oil Company has been organized at Waxahachie, Texas, with a capital stock of \$20,000 for the purpose of conducting oil development operations. The incorporators are J. W. Rossen, T. H. Harbin and W. K. Ward.

The Pacific Coast

SAN FRANCISCO, CAL., June 4, 1912.

The general demand for machine tools continues inactive. No large inquiries have appeared in this part of the coast since the Southern Pacific list was given out, and so far no business has been done on this list. Single tool orders are only moderate in volume, and come largely from the garage trade, which usually takes a small type of equipment. A few larger projects are talked of, but are very slow in coming to a head.

A good aggregate of orders is reported in some lines of wood-working machinery, though only a few complete mill outfits are being placed. In other lines the demand continues active. The movement of irrigation equipment shows no sign of curtailment, and a great deal of special machinery is being installed in fruit canning and curing plants. Road building equipment receives more attention than for some time past, and a number of new crushing plants have been ordered. Numerous orders are also coming from California mining interests, and a heavy demand is expected from Mexican mines as soon as conditions in that country are fairly settled.

Jensen Bros., Santa Cruz, Cal., are installing a large automobile shop and have ordered a No. 2 Cincinnati universal miller, a 20-in. Aurora drill press and several other tools.

Two fair orders have recently been placed by sugar plantations in the Hawaiian Islands. The Hakalau Plantation Company has ordered a 30 x 30-in. x 8-ft. Dietrich & Harvey open-side planer, a radial drill, etc., and the Pauhauau Plantation Company has ordered a 24 x 16-in. Lodge & Shipley lathe and a 4-ft. Niles universal radial drill.

The Western Pacific Railroad will receive bids shortly on a double-ended screw propeller steel ferry-boat for use on San Francisco Bay. The engine will be 2500 hp.

For its electric lighting plant the city of Alameda, Ca., is having specifications prepared for a 650-hp. Diesel engine and a steam turbine of similar capacity.

The Union Tool Company, which is building a large plant near Los Angeles, has placed an order for eight electric traveling cranes.

The California Paper & Board Mills Company has commenced rebuilding its plant at Antioch, Cal., and will install new machinery to increase its capacity by about 20 tons daily.

The Grant Gravel Company, this city, is putting a lot of new machinery in its Livermore Valley, Cal., plant.

Several inquiries are coming out for machinery for manual training schools. The Oakland, Cal., High School will spend several thousand dollars this summer for both iron and wood-working machinery.

The Pacific Gas & Electric Company is proceeding with its Lake Spalding dam, and for this work has placed orders for a lot of Smith concrete mixers, two No. 6 McCulley crushers, three locomotives, six yard cars and a lot of elevating and conveying machinery.

The Union Iron Works Company is about to start work on a steel and concrete power house, the building alone to cost \$75,000.

The Jos. F. Mitchell Machine Company has taken a five-year lease on a building to be erected on Beale street, near Mission, this city.

The Southern Pacific Railroad has ordered nine Westinghouse electric locomotives for use on its Pacific coast suburban lines.

The town of Pasadena, Cal., is taking figures on a steam roller.

The Union Lumber Company is planning to add a tank factory to its mill at Fort Bragg, Cal.

The California Eucalyptus Lumber Company pro-

poses to add a number of new machines to its plant at Oxnard, Cal.

The E. B. & A. L. Stone Company, this city, has ordered a large tube mill to be installed at its lime rock quarry south of San Francisco.

The town of Whittier, Cal., is preparing to install a new pumping outfit.

At Redlands, California, a bond issue of \$600,000 has been authorized to provide for a municipal water system.

The Pacific Sewer Pipe Company, Los Angeles, announces plans for an additional plant at Los Nietos, Cal.

It is reported that the Pullman car shops at Richmond, Cal., will be materially enlarged before the end of the year.

Ward Bros., who recently patented a new rock drill, are putting up a machine shop near Folsom, Cal.

The Healy-Tibbitts Construction Company, this city, has ordered a no. 5 and a No. 3 McCulley crusher for its rock quarry at Richmond, Cal.

The Southern California Edison Company is preparing to add a new unit to its Long Beach power plant, and will put in a substation at the town of Van Nuys.

General machinery valued at \$36,000, formerly in the stock of Henshaw, Bulkley & Co., this city, was put up at auction June 1.

The dredge Oakland, undergoing repairs at the Craig shipyard, Long Beach, Cal., preparatory to starting work in San Francisco Bay, was destroyed by fire May 26. It was valued at \$50,000.

The Washington Pipe & Foundry Company, Tacoma, Wash., is planning to double its capacity and will erect new foundry buildings.

At Burley, Ohio, a bond issue of \$85,000 has been voted to provide for the installation of water and sewerage systems and for the extension of the electric lighting plant.

Eastern Canada

TORONTO, ONT., June 10, 1912.

The weather continues to be unseasonably cool, and there have been temperatures not much above freezing point some nights since the beginning of June. This has caused considerable anxiety for the fruit crops and some other tender products of field culture. So far, however, no damage is reported. Good news comes from the Western wheat lands and the crop prospects are at the moment excellent.

Money is in demand for manufacturers' use, and it is forthcoming in fairly liberal measure, as the large amounts tied up in wheat throughout the winter are being released by the present movement to market. Many conditions incidental to national growth are pressing manufacturers into new and larger enterprises. The trade situation is reported to be at its best. Factories are busy and cannot get men enough to work in them.

The Courtenay Construction Company, Montreal, has been incorporated with a capital stock of \$300,000, under Dominion laws.

The Automatic Safety Damper & Mfg. Company, Montreal, has been incorporated with a capital stock of \$750,000 under Dominion laws.

La Compagnie Electrique des Laurentides, St. Lin des Laurentides, Que., has been incorporated with a capital stock of \$149,000, under Dominion laws.

The Canadian Pacific Railway is said to be in the market for 20,000 to 25,000 cars and 250 locomotives.

It is the intention of the Imperial Steel & Wire Company, Collingwood, Ont., to increase the capacity of its mills in the near future.

The by-law to grant a \$10,000 loan to Charles Kreutziger for the erection of a new box factory was carried by a majority of the ratepayers of Waterloo, Ont.

Fire which broke out in the premises formerly occupied by the Peck Rolling Mills, Montreal, did damage to the extent of \$25,000.

Daniel McKenzie proposes to erect in Guelph, Ont., a factory in which to make tools and small machines.

The Anchor Mfg. Company is arranging to establish in Guelph, Ont., works for the manufacture of iron and brass bedsteads.

The Gutta Percha Rubber Company has taken out a permit to erect a two-story factory in Toronto, to cost \$12,000.

A contract has been let for the construction of two

large shops and a power house for the Western Dry Dock & Shipbuilding Company, at Port Arthur, Ont. Orders for the steel frames and beams are to be placed at once.

The Norton Griffiths Company, an English corporation, which has the great contract for the improvement of St. John harbor, N. B., at an expenditure of many millions, is credited with the purpose of establishing a large steel plant at St. John in connection, perhaps, with the Drummonds of Montreal, who are the controlling interests in the iron works at Londonderry, N. S., and the iron ore deposits at Bathurst, N. B.

The Canadian Boring Company is installing a plant at the municipal pumping station of St. Thomas, Ont. One centrifugal pump has a capacity of 3,000,000 gal. per 24 hours, and the other has a capacity of 5,000,000 gal.

The City Council of St. Thomas, Ont., has instructed its water works engineer to prepare estimates for 2500 ft. of 18-in. pipe.

E. Crabtree & Son, Ltd., paper manufacturer, Crabtree Mills, Que., is arranging for extensions.

A. Sommer & Co., Ltd., Montreal, are erecting offices and warehouse to cost \$100,000.

N. K. Fairbank & Co., Montreal, are putting up a manufacturing plant in Cote St. Paul, Montreal.

The Canadian Rubber Company, Montreal, is making extensions to its plant.

The St. Maurice Valley Cotton Mills Company, Three Rivers, Que., is preparing to erect a plant.

The Electric Company of Canada, Toronto, has been incorporated with a capital stock of \$1,000,000.

The Montrose Paper Mills Company, Thorold, Ont., recently amalgamated with the St. Lawrence Paper Mills Company, has let the contract to J. M. Tremble, of Niagara Falls, for the construction of new buildings which will cost \$500,000. A Worcester firm is now at work on the new book and writing paper machine for the company, which will require twenty-seven cars to transport it to Thorold.

The Shredded Wheat Company will erect another large plant at Niagara Falls, Ont., with a capacity of 200,000,000 biscuits a year.

The Pemberton Lumber Company's dam, at Scottstown, Que., has been swept away and the electric power station at the south end of the structure destroyed.

The British Columbia Electric Railway, of Vancouver, has appropriated \$2,750,000 for new electrical equipment. Approximately \$1,000,000 is to be spent in installing three 14,000-hp. units in the hydroelectric station on the north arm of Burrard Inlet, \$225,000 for steam turbo plant in Vancouver, \$1,500,000 on substation, light, and service improvements, including two 1000-kw. motor generator sets and two 3000-kw. transformers. The substations at Vancouver, Lulu Island, New Westminster, Point Grey and Burnaby are to be doubled in capacity and \$25,000 is to be spent for alterations and extensions to emergency power plant in Victoria.

Sydney, N. S., ratepayers by an overwhelming majority have voted to grant a bonus of \$1,000,000 to the British Canadian Shipbuilding Company for the establishment of a shipbuilding plant in the city.

The Nova Scotia Car Company, Halifax, will add an axle plant to its works.

The Nova Scotia Steel & Coal Company has launched out on a new enterprise. With a capital stock of \$2,800,000, all underwritten, it was decided at a recent meeting of the directors of the company at New Glasgow, N. S., to erect a car manufacturing plant capable of producing 25 cars a day, and to begin construction at once. The new enterprise was incorporated as the Eastern Car Company. The capital will consist of \$1,000,000 in bonds, \$1,000,000 in preferred stock and \$800,000 in common stock. The rapid expansion of railways and the present incapacity to meet demands point to success for the scheme. The location of the plant has not been ultimately settled yet, but either New Glasgow or Pictou, which lie close to one another, will be chosen. The car company will employ 800 to 1000 men. The Nova Scotia Steel & Coal Company has just installed hydraulic machinery for molding steel, which molds ten times as quickly as the old steam hammer method.

The sawmills of the C. Beck Mfg. Company, Penetanguishene, Ont., were destroyed by fire. Much of the destroyed machinery was new.

Taylor, Scott & Co., Toronto, have purchased the woodworking establishment of Major Wooldridge, Palmerston, Ont., and take possession at once. The building is a substantial brick structure of two stories, with cement throughout the ground floor, but extensions will be made to accommodate the machinery to be installed.

The rate payers of St. Catharines, Ont., have voted to furnish 12 acres of land for a manufacturing plant to be erected by the Reo Motor Car Company to cost \$100,000, and to have a fixed low rate tax assessment for ten years. The new factory is to be erected on Yale Crescent, between the present plants of the Canadian Yale & Towne Company and the Steel & Radiation Company.

The Buffalo Brake Beam Company, Buffalo, N. Y., is having plans completed by Architects Prack & Perrine, Hamilton, Ont., for its Canadian branch plant to be erected in that city, the estimated cost of which is \$250,000. W. M. Currie, Freeman Place, Hamilton, is to be manager.

Incorporation papers have been filed by D. C. McDonald & Bros., Guelph, Ont., with a capital stock of \$150,000. The new company will engage in silk weaving, cotton spinning and cloth manufacture. Hugh and Norman McDonald and C. L. Dunbar are the directors.

The Battle Creek Toasted Corn Flakes Company, A. A. Campbell, president, is having plans prepared for a four-story factory building of reinforced concrete which it will erect at East London, Ont., at an estimated cost of \$100,000.

The Canada Foundry Company has completed plans for the erection of a foundry at Toronto, Ont., for the manufacture of ornamental iron. The estimated cost is \$100,000.

The Commissioners of the Transcontinental Railway, P. E. Ryan, secretary, Ottawa, Ont., are receiving bids for the erection of six 200-ton mechanical cooling plants, with sand house and track approaches, to be built at different points on the line of the railroad.

The Montrose Paper Mills Company, Thorold, Ont., recently amalgamated with the St. Lawrence Paper Mills Company, of Mille Roches, has let the contract to J. M. Tremble, Niagara Falls, for construction of the new mill buildings at Thorold which with the equipment to be installed will cost \$500,000.

The Ottawa Car Company, Thomas Ahearn, president, Ottawa, Ont., manufacturers of railway cars and traction automobiles, will build a new plant at Britannia, a suburb. The buildings will cover an area of about two acres.

Western Canada

WINNIPEG, MAN., June 6, 1912.

There was a slight falling off in the volume of orders placed by local machinery houses this week, but that is considered to be temporary, for there were more announcements of new undertakings than last week. The foundries and wholesale houses are actively at work on business placed previously. A large party of English capitalists are expected to arrive in the West in a couple of weeks to tour Canada. It is understood that the object of their visit is to look into the opportunities for investment in this new country, and the chances for developing the various industrial resources. An excursion of eastern Canada captains of industry is touring western Canada at the present time. It is announced that at the middle of this month a group of Minneapolis business men and capitalists will visit Winnipeg in a body. The attention the moneyed people of outside parts are paying to this part of the Dominion is significant.

The new mill of the Finger Lumber Company, at Le Pas, in the new territory recently added to Manitoba, has started cutting. At present 200 men are employed, and it is reported that the plant will in the near future be enlarged to practically double its present capacity.

W. T. Raleigh, president of drug and perfumery manufacturers at Freeport, Ill., and Memphis, Tenn., capitalized at about \$1,000,000, is negotiating with the Winnipeg authorities with a view to establishing a factory here. He already holds an option on a site.

The ratepayers of Wainwright, Alberta, have unanimously voted in favor of a by-law granting certain concessions to the Wainwright Milling Company, which will at once proceed to erect a flour mill there of 125 barrels capacity, to be increased later to 250 barrels.

The General Realty Company, Port Arthur, west-

ern Ontario, of which Captain James Whalen is the head, will build a 10-story office building at a cost of \$410,000.

In Vancouver, B. C., the Canadian Pacific Railway Company has started work on subways and bridges, which when completed will have cost not less than \$3,000,000.

The New Era Transit Company, New York and Buffalo, has secured a large site on the outskirts of Winnipeg, on which it is proposed to establish a plant for manufacturing express and passenger cars. The property was bought from Aime Bernard, member of the Manitoba Legislature.

The plant of the Prince Albert Foundry Company, Prince Albert, Saskatchewan, burned a few days ago, with a loss of \$4,000 on the building and \$17,000 on the plant. It was one of the most flourishing industries in that part of the country, and will, no doubt, be rebuilt at once.

Work on the La Colle Falls power plant, at Prince Albert, Sask., will start in a few days. It is stated that some of the machinery is now on the way from New York and Toronto. The work is being done by the Ambursen Hydraulic Construction Company.

The ratepayers of the town of Melfort, Sask., have voted favorably on the by-law providing \$125,000 for water works and electric light.

It is announced that the Quaker Oats Company, Chicago, will establish a plant at Saskatoon, Sask. The plant will have a capacity of 250 barrels of oatmeal per day and 500 barrels of cereal.

The Berlin Bedding Company, Ltd., Berlin, Ont., has signified its intention to build a branch factory at Fort William.

The ratepayers of Saskatoon, Sask., have carried by-laws providing for \$175,000 worth of electric light and power machinery, and the extension of the system.

S. E. Whiting, president of the Bassano Electric Power & Traction Company, Bassano, Alberta, is calling for tenders, until June 17, 1912, for two return tubular steam boilers, one steam engine and one electrical generator and equipment.

Tenders are being received by Engineer Martin, Battleford, Sask., for two turbo-generators directly connected with two 250-hp. Mirrless Diesel engines. Also switchboards and instruments of latest type.

Engineer J. G. Glassco, 54 King street, Winnipeg, is calling for tenders for a power substation for the city of Winnipeg; also electrical apparatus. The City Council is contemplating the purchase of one 75-hp. electric motor to cost about \$750; two 50-hp. electric motors to cost about \$900; one 100-hp. electric motor to cost about \$970.

The Edwardsburg Starch Company, Ltd., Edwardsburg, Ont., will erect a starch and glucose factory at Fort William.

Government Purchases

WASHINGTON, D. C., June 10, 1912.

The Isthmian Canal Commission, Washington, will open bids July 8, under canal circular 715, for auxiliary electrical equipment for the Gatun hydro-electric station, which include an air compressor crane equipment, switchboard transformers, batteries, etc.

The Department of the Interior, United States Reclamation Service, Elephant Butte, N. M., will open bids June 20 for furnishing ball mills, tube mills, a rock crusher, a rotary dryer and a mixing and weighing machine for a sand cement plant on the Rio Grande project.

The United States Reclamation Service, Federal Building, Los Angeles, Cal., will open bids June 21 for furnishing and delivering three 85-hp., 220-volt induction motors, one 50-hp., 220-volt induction motor and four 4500-volt, 100-ampere oil switches.

The supervising architect, Treasury Department, Washington, will open bids June 17 for two new engines and generators for the United States post office, Baltimore, Md.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids June 4 for material and supplies for the Navy Yards as follows:

Schedule 4528, class 1, one 10-ton three motor electric jig crane—Bidder 137, Whiting Foundry Equipment Company, Harvey, Ill., \$3790; alternate, \$3350.

Schedule 4545, class 47, two recoil cylinders—Bidder 18, Bethlehem Steel Company, Bethlehem, Pa., \$1853.70; 80, Midvale Steel Company, Philadelphia, Pa., \$1853.70.

Schedule 4546, class 51, one electric jib crane—Bidder 137, Whiting Foundry Equipment Company, Harvey, Ill., \$3250; 146, Brown Hoisting Machinery Company, Cleveland, Ohio, \$4475.

Trade Publications

Roller Bearings for Line Shaft Boxes.—Hyatt Roller Bearing Company, Newark, N. J. Bulletin No. 400C. Size, $3\frac{1}{2} \times 6\frac{1}{4}$ in.; pages, 20. Contains a description of the Hyatt boxes for line shafting which are equipped with roller bearings. It also shows interesting efficiency tests and gives dimension tables and price lists of the various standard sizes of boxes and pillow boxes.

Automatic Weighing Machinery.—Richardson Scale Company, 3 Park Row, New York City. Bulletin No. 6111. Illustrates a line of automatic weighing machines for coal, ore, rock, grain, granular and powdered products of every description, water, oil and other liquids, etc. All of the different types of scales are described at length and dimension tables and a number of testimonial letters are included.

Oil Engines.—Remington Oil Engine Company, Stamford, Conn. Bulletin No. 4. Shows the great variety of work which these engines are now doing. Among these are pumping service, driving air compressors, operating hoisting outfits for contractors and handlers of gravel, coal, cement and general freight and driving electric generators. The engravings are supplemented by brief text descriptions and the main features of the engine's design are also touched upon.

Presses.—Meriden Press & Drop Company, 153 State street, Meriden, Conn. Catalogue No. 12. Shows an extensive line of inclinable, open and solid back, bench, cut and draw, straight sided, double crank and sprue cutting presses. For the most part a page is devoted to a single type, an engraving being given at the top followed by a brief description and a condensed specification table. Mention is also made of a line of drop hammers and forge drops and the manufacture of special dies and tools which this company has also undertaken.

Chucks.—Westcott Chuck Company, Oneida, N. Y. Catalogue H. Covers the line of Westcott lathe and Little Giant drill chucks. These are made in all of the customary types, four styles of drill chuck and nine styles of lathe chuck in all being manufactured. All of these are described at some length and the text is supplemented by halftone engravings.

Switchboard Panels.—General Electric Company, Schenectady, N. Y. Five bulletins. Nos. 4901 and 4902 are devoted to the alternating and direct current panels built by this company; the former bulletin supersedes the No. 4819. Nos. 4904 and 4905, the former superseding No. 4807, illustrate and describe switchboard panels for use in small central stations and isolated plants. Connection and dimension diagrams of panels of various sizes are included in both. No. 4917 is concerned with a line of direct-current exciter panels which are for use in connection with alternating-current generator panels when separate control of the exciters is desired. It supersedes No. 4782.

Compressors.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Four bulletins and a pamphlet. Nos. 34A, 34C and 34E deal with the class G steam driven, tandem gasoline driven and railroad types of air compressors. The different styles are illustrated and described with dimension tables. General instructions for installing and operating these compressors are given in bulletin No. 34H and a complete list with numbers of the different repair parts is included. Pamphlet No. 90 illustrates and briefly describes the various machines for air and gas compression.

Calendar.—Wagner Electric Mfg. Company, 6400 Plymouth avenue, St. Louis, Mo. Calendar hanger measuring 11 x 14 in. The upper portion of the hanger has a pad printed in contrasting colors which runs from June 1 to May 31. The balance of the hanger is unusually devoid of advertising, the only evidences being the company's slogan Wagner, Quality and a reproduction of one of its motors. The calendar from July 1, 1913, to June 30, 1914, is printed on the hanger under the regular pad.

Motor-Driven Printing Machinery.—Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth street, New York City. Bulletin No. 237 superseding No. 229. Illustrates a large variety of direct and alternating current motor equipment for printing machinery. In addition to the motor equipment attention is called to generators and switchboards for light and power, electric hoists for conveying rolls of paper to the presses, ventilating outfits and conduit for electric wiring. A list of installations arranged alphabetically by states and cities is given in the back of the book.

Grinding Machines.—Bath Grinder Company, Fitchburg, Mass. Catalogue. Concerned with grinding machines of the cylindrical, universal and surface types. Each line is described at length, followed by engravings and brief specifications of the different sizes of machines. Among the machines described is the No. 5 duplex internal grinding machine, which was illustrated in *The Iron Age*, March 23, 1911.

Fuel Feeder.—Eli Teeter, East Orange, N. J. Folder. Refers to a fuel feeder and ionizer which enables kerosene to be substituted for gasoline in internal combustion engines.

Slag Cement.—Stewart Iron Company, Ltd., Sharon, Pa. Catalogue. Concerned with the Stewart Portland slag cement. The special features of it, such as fineness, uniformity of product and strength are touched upon with a brief description of the process of

manufacture and directions for using it. A number of testimonial letters and results of tests made by different engineers are included.

Aero Motor.—Frontier Iron Works, Letchworth and Grant streets, Buffalo, N. Y. Catalogue. Contains a brief description of the V Model A eight-cylinder Frontier aero motor, which was illustrated in *The Iron Age*, December 7, 1911.

Pneumatic Tools.—Independent Pneumatic Tool Company, Chicago, Ill. Circular O. Refers to a close quarter piston air drill, a breast and screw feed drill, a reversible compound drill and a pneumatic hammer for chipping, calking and riveting. These are illustrated and briefly described and a complete table of dimensions of the various sizes is included.

Tappet Rock Drills.—Ingersoll-Rand Company, 11 Broadway, New York City. Form No. 4204. Size, 6 x 9 in.; pages, 16. Gives general description and specifications for the arc valve tappet rock drill which has an arc-shaped valve that is moved on a circular seat by a rocking tappet, the sliding surfaces all being concentric with the rocker pin. The valve is forced to its seat by the working pressure which is on its back. The piston transmits motion to the valve through an intermediate tappet or rocker which swings on a pin and extends slightly into the cylinder bore where it is moved by beveled shoulders on the piston sliding under it. An arm of the tappet carries a spring and plunger engaging the valve. This type of positive valve movement is claimed to be particularly useful where steam is used and water of condensation is likely to be encountered. Sectional views of the drill are shown and a list of duplicate parts together with a descriptive table of sizes and capacities is included.

Worm Gearing.—Fawcett Machine Company, 2828 Smallman street, Pittsburgh, Pa. Circular. Concerned with the various sizes and styles of worm reduction gears which this company is prepared to furnish in pitches ranging from $\frac{1}{4}$ to $1\frac{1}{2}$ in. with single, double, triple and quadruple threads. In a discussion of the advantages of worm gearing for transmitting power are briefly touched upon and the various arrangements of standard gear cases are shown. In addition the company is prepared to furnish worm gears up to a maximum diameter of 10 ft. and a 4-in. pitch.

Boiler Tools.—J. Faessler Mfg. Company, Moberly, Mo. Illustrated folder. Shows the Faessler octagonal sectional expanders, roller expanders and a flue cutting machine. These expanders are made for hand, pneumatic or electric motor drive. In addition to the standard boiler tools the company is prepared to furnish special types and sizes of flue expanders and cutters.

Blowers.—Wilbraham-Green Blower Company, Pottstown, Pa. Bulletin No. 7. Illustrates and describes a rotary positive pressure smelter blower which is of the two-impeller type. In this latest blower the construction has been made heavier and the dimensions of the bearings and gears increased together with slight changes in the design of the impellers. Data regarding the capacity, horsepower and approximate dimensions are given.

Ratchet Wrench.—Convertible Ratchet Wrench Company, Allentown, Pa. Folder. Relates to a convertible ratchet wrench in which the handle can be adjusted to 32 different positions to give an increased amount of leverage. This tool is designed for use in awkward corners and cramped spaces where it is not possible to use the ordinary wrench, the change from one position to another being easily and quickly made.

Molding Machine.—Newman Machine Company, Greensboro, N. C. Folder. Deals with a new type of extra heavy molding machine which is built in six different sizes ranging from 7 to 14 in.

Iron and Steel Preservation.—Goheen Mfg. Company, Canton, Ohio. Pamphlet. Treats of a carbonizing coating which is intended to be applied to iron and steel bridges and other structures for their preservation. With the exception of four pages the pamphlet is given over to illustrations of various structures where this coating has been used. Among these are the large cantilever railroad bridge over the Ohio River at Beaver, Pa., the Florida East Coast Line Railway construction over the Florida Keys, copper plants, pipe lines, gas tanks and ore bins.

Sewage Ejectors.—Merritt & Co., Camden, N. J. Two pamphlets. The first of these takes up the various applications of the Priestman hydro-pneumatic ejectors and discusses them at length as well as describing the apparatus. The other pamphlet is technical in character and analyzes the various advantages of the centrifugal pump and compressed air ejector. Tables giving the average efficiency of these types are included. A brief description of the installation at the Pennsylvania Terminal in New York City, where 18 ejectors handle a flow of sewage equivalent to that which would be contributed by a city of 40,000 inhabitants, completes the pamphlet.

Automatic Motor Starting Control.—Reliance Electric & Engineering Company, Cleveland, Ohio. Bulletin No. 7010. Calls attention to a line of automatic starting control devices which are intended for use with motor-driven machinery. Various machines equipped with this control are shown, among these being a shaping machine equipped with this type of control, which was illustrated in *The Iron Age*, March 28, 1912, and several tools in the shops of the Chicago Railways Company, where hand wheels and push buttons are employed to operate the control. An illustrated description of this installation appeared in *The Iron Age*, May 4, 1911.

Concrete Mixer.—Miles Mfg. Company, Jackson, Mich. Pamphlet. Devoted to a line of concrete machinery which includes mixers, block and brick machines and molds of various types.

